MAY 10 1994 (11)

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0037016

ENGINEERING DATA TRANSMITTAL

1. EDT 605138

2. To: (Receiving Organization) Environmental Restoration	3. From: (Originating Organization) Environmental Restoration	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: WAE/1P	6. Cog. Engr.: A. L. Langstaff	7. Purchase Order No.: N/A
8. Originator Remarks: Internal Release - Volumes 1, 2, and 3. To record file only, no distribution		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: N/A
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date:

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15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Impact Level	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-EN-DR-001		Rev. 0	100-BC Area Remedial Activities Pre-Design Report	~~Q~~ N/A	1/2	1	

16. KEY

Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature (M) MSIN	(L) Date	(J) Name	(K) Signature (M) MSIN	(L) Date	(G) Reason	(H) Disp.
1/2	1	Cog.Eng. A. L. Langstaff	A. L. Langstaff	5/10/94					
1/2	1	Cog. Mgr. M. J. Lauterbach	M. J. Lauterbach						
		QA							
		Safety							
		Env.							

18.	19.	20.	21. DOE APPROVAL (if required)
A. L. Langstaff A. L. Langstaff 5/10/94 Signature of EDT Originator Date	Authorized Representative Date for Receiving Organization	M. J. Lauterbach 5/10/94 M. J. Lauterbach Cognizant/Project Engineer's Manager Date	Ltr. No. [] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (07/91) GEF097

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SUPPORTING DOCUMENT		1. Total Pages ~~283~~ 702
2. Title 100-BC Area Remedial Activities Pre-Design Report	3. Number Vol. 1,2,3 WHC-SD-EN-DR-001	4. Rev No. 0
5. Key Words remediation, CERCLA, cleanup, removal actions, past practice sites, reactor area cleanup, conceptual design	6. Author Name: A. L. Langstaff A. L. Langstaff Signature Organization/Charge Code ~~81330~~/P161B 85A00	

7. Abstract

Langstaff, A. L., 1993, *100-BC Area Remedial Activities Pre-Design Report, WHC-SD-EN-DR-001, Rev. 0*, prepared by IT Corporation for Westinghouse Hanford Company, Richland, Washington.

9. Impact Level ~~3Q~~ N/A

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Document Number: WHC-SD-EN-DR-001, Rev. 0

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EXECUTIVE SUMMARY

Investigation and remediation of the past-practice waste sites is processed according to the terms set forth in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989), initially signed in 1989 by the U.S. Department of Energy, the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology). Since the Tri-Party Agreement was signed, studies have been performed which indicate that the costs of completing investigations and remediation as originally planned are very large and the time required for implementation could exceed the deadline. For this reason, additional studies were undertaken to identify a faster and less costly approach to achieving the cleanup objectives of the agreement. These studies resulted in an alternate approach to Hanford remediation, referred to as "macroengineering," but which was subsequently renamed "large-scale remediation" (LSR). In this approach, remediation is conducted on a large scale (i.e., by aggregate area rather than by operable unit) using conventional technologies and systems commonly employed in the construction industries, but adapted to meet Hanford-specific objectives and conditions.

Following completion of the LSR conceptual studies, further evaluation was required on the technical and economic feasibility of the LSR to consider it as an alternative for source unit remediation. The 100 B/C Area was selected as the location to apply the large scale source unit remediation because substantial waste site characterization data are available for this area.

The 100 B/C remediation requires design of material handling, analytical, and transportation systems. Soil and solid wastes removed from this area will be transported and disposed of in a new Environmental Restoration Disposal Facility (ERDF) to be constructed in the 200 Area. Design of the disposal facility for the excavated wastes is being handled as a separate project.

The purpose of this report is to document the pre-design of the material handling and transportation systems for the 100 B/C remediation. Design of analytical systems is not within the scope of this report and is being performed concurrently in a separate project with separate documentation. However, because there are mutual impacts, designs of both the material handling/transportation and the analytical systems are closely coordinated and integrated.

This pre-design report serves as the basis for generating the final design/construction documents (i.e., bid documents) for 100 B/C remediation. This pre-design phase is structured to satisfy the remedial design requirements of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (preliminary design phase) as specified in the guidance (EPA 1986).

Objectives and Scope

The objectives of this project are to:

- Develop all systems, equipment, technologies and procedures, on a full scale, for characterization, removal, conveyance, and transport of contaminated soil and solid wastes derived from the past-practice waste sites.

- Complete the remediation of all 100 B/C past-practice sites, included within the defined project scope, within the specified time-frame (within six years from start of construction activities).

The specific waste sites that are included within the scope of the pre-design consist of the following:

- Sixty-two past-practice waste sites in the 100 B/C Area as currently identified in the Waste Information Data System (WIDS) database (DOE/RL 1988).

- Buried reactor effluent pipelines between the 105 buildings and outfall structures and associated contaminated soil from pipeline leaks.

In addition to these waste sites, the scope of the 100 B/C remediation includes other structures or newly discovered waste sites and unplanned and/or unreported releases which are not currently listed in the WIDS database and which are not addressed by other programs.

Coordination With Other Programs

Successful completion of remedial activities in the 100 B/C Area will require coordination with the following:

- decontamination and decommissioning program
- remedial investigation/feasibility study (RI/FS) programs
- maintenance of active systems in the 100 B/C Area
- ERDF
- site services.

Remedial operations must coordinate with these activities to allow each program to accomplish the desired goals without duplication of effort or undue interferences.

Extent of Contamination

The 100 B/C remedial design requires estimation of the volume and depth of contaminated material to be removed. These estimates provide the basis for development of excavation methodologies, throughput, and interactions between adjacent sites and other facilities.

The estimate includes minimum, maximum, and probable volumes by type of waste (soil, metal, concrete, and solid waste [i.e., non-metal compactible material]), and the minimum, probable, and maximum depth of contamination. The estimates are divided in this way to show the potential variability of the volumes with respect to the assumptions. The 100 B/C remedial system is designed for the probable case, with contingencies for handling the maximum. The minimum case is presented as a lower bound to the volume estimate. The probable volume is the most likely volume, based on available sampling data and operations records. The maximum volume is the largest reasonable volume. For liquid waste sites the difference between the probable and maximum volumes is directly related to the difference between expected depth of contamination and groundwater.

Estimates of the extent of contamination within waste sites are based upon a compilation of available data including:

- historical photographs
- information contained in the WIDS (DOE-RL 1988)
- historical evaluations (e.g., Miller and Whalen 1987)
- historical sampling and analysis results (e.g., Dorian and Richards 1978)
- recently completed limited field investigations (LFI)
- professional judgement where no data are available.

Results of these volume estimate show total in situ contaminated volumes as follows:

- Minimum 0.5 million bank cubic yards (BCY)
- Probable 1.6 million BCY
- Maximum 2.7 million BCY.

About 60% of the probable volume (design basis) is contaminated material associated with the retention basins.

Excavation Approach

The excavation strategy is influenced by the following considerations:

- operational parameters for the equipment selected for excavation, demolition and transportation of materials

- the methods employed for removal, monitoring, transport and processing of the excavated materials

- design requirements for the excavation, access routes, spoil stockpiles and final topography.

The excavation is performed using sufficient numbers of equipment systems to complete remediation within five years from start of field operations. To determine the number of systems necessary to complete the 100 B/C Area remediation, the removal rates and volumes are required. However, the removal rate is variable depending on the type of material and the type of site.

Excavation or demolition rates differ according to the type of material being removed and the excavation or demolition process involved. For example, structure demolition is much slower on a cubic yard basis than soil excavation.

Sites are categorized into five types as follows:

- large sites - the 116-B-11 and 116-C-5 retention basin sites
- medium sites - all sites with excavated volumes >5,000 loose cubic yards (LCY) with exception of retention basins; includes pipelines and contaminated soils associated with pipeline leaks; generally, "trench-type" sites
- small sites - all small, pit type, excavations with excavated volumes <5,000 LCY (i.e., cribs and french drains) except sites with significant buried structures (such as outfall structures)
- sites with buried structures - sites with significant concrete or metal structures, such as an outfall structure, septic tank, or partially demolished ventilation stack
- burial grounds - sites used for the disposal of solid waste, including burn pits, ash pits, and construction burial grounds.

Each of these material and/or site types requires a different mix of equipment and different excavation approaches to optimize efficiency and reduce waste volume. The excavation approach is interdependent with the analytical approach and both must occur in concert.

Excavation Methods

Major excavation and demolition equipment are categorized into five operational groups as follows:

Group No.	Equipment Items
E1	excavator (backhoe)
E2	bulldozer and wheel loader
E3	excavator with grapple attachment; grapple sleeve or bucket is applied when handling soil

E4 excavator with interchangeable demolition/processing attachments
E5 excavator with mobile shear and densifier attachments.

The excavation/demolition strategy for large sites (retention basins) is briefly described as follows:

- basin fill is removed via the E3 equipment group with bucket attachment
- concrete walls are demolished using the E4 group and either a hydraulic hammer or pulverizer attachment
- steel walls are cut with the E5 shears
- all materials are loaded with the E3 equipment
- soil beneath the basins is removed in one-foot lifts using the E2 and E1 groups which work in tandem with a monitoring vehicle which guides the excavation
- the E1 excavator is used to remove and segregate materials in the fringe area (a 10 ft band at the interface between the contaminated and clean zones)
- the E2 group is used to construct ramps (10% grade) into the excavation.

Medium sites follow the same general approach as large sites. Overburden (clean soil) is removed with the E2 group and moved either to a local spoil stockpile or to a central spoil stockpile. Pipelines are uncovered with the E1 group; pipes are cut with the E5 shears; pipe sections are lifted with the E3 grapples; pipe sections are flattened with the E5 densifier attachment.

Small sites differ from medium sites in that excavation equipment operates from the surface and does not enter the excavation. The excavation proceeds using the E1 excavator; monitoring is conducted in tandem with a boom-mounted probe.

Sites with structures and burial grounds are excavated using the same types of equipment described above; the specific approach is tailored for each type of site depending upon the size or the site and the nature of the material to be excavated.

All excavations are constructed with 1.5/1 side slopes, the assumed excavation slope angle for the material and the Occupational Health and Safety Administration (OSHA) slope angle recommended for worker safety. Access ramps are constructed at a 10% slope with 1.5/1 side slopes to provide access for haul trucks. Access ramps with a 20% slope are constructed to the bottom of the small sites to provide access for the monitoring vehicle.

Excavated Volumes

Based on the estimated volumes of contaminated material in each site and upon estimates of clean material which must be excavated around the contamination, the following estimates of excavated materials were generated. All values are given in LCY which accounts for material swell as it is excavated.

- total excavated material — 3.6 million LCY
- total transported to ERDF — 2.0 million LCY
- total clean material stockpiled for backfill — 1.6 million LCY

Excavation Duration

The 100 B/C remedial system is designed to remediate the 100 B/C Area in five years from start of field operations. Operations design bases are listed as follows:

- The system will operate year-round for a total of 250 operating days.
- Twenty-percent downtime or 50 days is assumed for weather delays.
- Operations for the demonstration phase (first year of operation) will occur in one shift per day (total of 200 operating shifts in the first year).
- Operations for the remediation phase (second year and beyond) will occur in two shifts per day (total of 400 operating shifts per year).
- In the final (fifth) year, excavation operations will be conducted over two shifts per day for the first six months of the year (total of 200 operating shifts). The final six months is reserved for completion of site reclamation and project closeout.
- Each shift is eight hours; productive time is seven, 45 minute periods, with a net production time of 5.25 hours per shift. Non-productive time is assumed to be associated with clothing changes, breaks, safety meetings, and other activities related to personnel safety and radiation protection.

Based on the above assumptions, over the five years given to complete this project, there will be a total of 1,600 shifts worked or total of 8,400 productive hours worked.

Excavation Sequencing and Production Rate

Development of a logical sequence of site excavations considers the following parameters:

- available equipment resources and load leveling
- site type and complexity
- duration of excavation activities required for each site type
- learning curve and ramp up
- proximity of sites to each other
- weather
- coordination with decontamination and decommissioning (D&D) program.

Based on the sequencing and load leveling, the resource requirements (number of equipment units) are derived. Production (material generation) rates are estimated based on the sequencing plan. Based on inspection of the variations in monthly production rates, a design rate of 3,900 LCY/shift is established.

Material Transport

Transport systems include containers, container handlers, trucks which haul containers to the container transfer area (railcar transfer) or to the clean stockpile, and rail systems which haul containers to the ERDF.

The containers are constructed of steel and are all reusable. The container is provided with a removable lid which is designed to prevent fugitive dust generation during railcar transport. A gasketed end gate provides an opening over the entire end area of the container such that contents can be fully discharged upon tilting the container. A gate latch mechanism is provided on the container to allow remote operation from inside the truck cab. Remotely operated locking attachments are provided on the bottom four corners of the container to secure the container to the truck-trailer frame. Lifting attachments are provided on the top four corners of the container to facilitate lifting by the container handler. Maximum design gross weight (container and contents) is 50 tons. Size of the container is nominally 8 ft in width, 20 ft in length, and 6 ft in height. Actual dimensions will be specified based on the maximum design weight. When the lid is applied and the container is filled to capacity (maximum 90% by volume) the container gross weight will not exceed the weight limit. A total of 130 containers are required.

Container systems are specified to conform to the substantive regulatory requirements and to provide remote handling of containers in conformance with the principles of as low as reasonably achievable (ALARA).

The design surface dose rate of the containers is 200 mrem/hr. A surface dose of 1 rem/hr is acceptable provided that operational controls are in place to ensure that exposure to personnel is kept to acceptable levels. Containers exceeding 1 rem/hr surface dose rate may be approved for shipment on a case-by-case basis. Container dose rates are monitored at the container surveying station.

Highway-type tractor/trailer trucks, similar to those used in the Uranium Mill Tailings Remedial Action (UMTRA) Grand Junction project, were selected for the preliminary design for transporting containers within the 100 B/C Area. Twenty trucks are required. The trailer frame provides attachments for lock-down of the containers, for remote operation of the container locking mechanism (from inside the truck cab) and for remote operation of the container latch mechanism. A tilt cylinder, actuated from inside the cab, is provided for emptying the contents of the container.

Trucks haul material from the excavation to the container transfer area via a network of access and haul roads. Haul roads are constructed by improving existing roads and building new roadways. Haul roads are constructed with a well-graded gravel top course stabilized with a binding agent. Access roads consist of graded pathways connecting the excavations and the haul roads.

Commercially available container handlers (2) are provided to transfer containers on and off trucks and rail cars.

The container transfer area is the point at which loaded containers are off-loaded from trucks to rail cars and empty containers are transferred from rail cars to trucks. This area also provides interim storage of containers, should storage be necessary. This area also provides storage of spare containers which are available to handle peak loading conditions. The area is located at the site of an existing switch (Audrey switch). Two sidings are provided to accommodate two trains at a time: one train of cars being loaded with filled containers and off-loaded of empty containers and one train of cars arriving from ERDF as the first is completing loading operations.

The rail system utilizes existing track from the Audrey switch to the Susie switch. Additional track is required for a route into the ERDF. The rail system in the vicinity of the Audrey switch requires upgrade to meet Class 3 standards allowing operating speeds of up to 40 mph for freight trains.

Based on the design rate and container cycle times, the rail system is required to handle 108 containers per shift. The rail system is sized to provide three trains of 15 rail cars each for a total of 45 cars. Each car accommodates two containers. To meet the required rate, a train schedule is specified which projects five train loads per shift round trip. This rate accommodates transport of 150 containers per shift.

A 200 ton, 3,800 horsepower locomotive provides a one-way cycle time of 30 minutes from the Audrey switch to the ERDF. Sixty used railcars have recently been acquired by DOE-Richland Operations Office (RL) from the U.S. Army. It is intended that these railcars be modified for use in Hanford site remediation programs. Each six axle flatcar is rated at a 100 ton capacity. Modification includes replacement of wood decking with metal and installation of brackets for securing containers.

Equipment Decontamination

Spread of contamination is minimized at the excavation site in three ways:

- Dust suppression is provided to control airborne contamination.
- Containers and trucks are designed with a minimum of horizontal surfaces where contaminated material can deposit.
- Excessive amounts of material on the exterior of the container or truck is manually removed prior to leaving the excavation site.

The equipment decontamination facility provides additional measures to ensure that the permissible limits are achieved for on-site shipments of containers. The facility also provides periodic cleaning of excavation equipment such as excavators and loaders.

The equipment decontamination facility includes a primary system consisting of an automated spray wash system, collection basins, and wastewater treatment. The automated spray wash system is used for routine container decontamination. A secondary system consists of a portable spray wash unit. The secondary system is available for non-routine or emergency use and to decontaminate excavation equipment. A structure encloses the automated system to prevent wind entrainment of contaminated spray.

Both the automated and the manual wash systems are set on separate concrete slabs which drain into a collection basin. Water from the collection basin is pumped to a water treatment system to remove solids. Capability is provided to recycle the clarified wash water, although it is intended that the water be routinely pumped to tanker trucks and used at the excavation sites for dust control. Capability is provided to periodically remove solids which settle out in the collection basin sump and wastewater treatment system. Solids are removed as a slurry into a vacuum truck. Vacuum truck solids are hauled to the ERDF.

Following decontamination, containers are surveyed (wipe tested) to assess the effectiveness of decontamination and to ensure that there is a low probability for spread of removable contamination during container rail transport. Two container survey stations are provided. Dose rates are first measured by stationary instruments located at a 10 ft distance from both sides of the container. The trucks are then parked next to the survey shelter for wipe sampling. Containers passing the wipe survey go directly to the container transfer area. Containers failing the wipe survey are routed through the container decontamination station for a more aggressive decontamination and surveyed again upon exit.

Dust Suppression

Water is applied to the active excavation face and at each point of emission (e.g., dumping of soil into a container). Water is also applied to control fugitive dusts on access ramps and haul roads. Water is supplied to each excavation site by water trucks. The water trucks are filled at the equipment decontamination station. A crusting agent is applied to all active excavations at the beginning of the off-shift to stabilize the disturbed surfaces overnight and on weekends. Active dumping areas of the clean soil stockpiles are stabilized by water application during on-shift hours. The stockpiles are stabilized with a continuous irrigation sprinkler. On the off-shift, the freshly deposited spoils are stabilized by application of a crusting agent.

Analytical System

The analytical system as applied to remediation of the 100 B/C Area consists of the following elements:

- site contamination conceptual model
- pre-excavation monitoring and analysis
- excavation monitoring and analysis
- container monitoring and analysis (classification structure)
- final site closure monitoring and analysis.

Details of the analytical plan are described separately in the 100 B/C analytical program plan which is being issued as a companion document to this preliminary design report (WHC 1993d).

The site contamination conceptual model provides a site-specific model of the nature and extent of contamination within a waste site based upon process knowledge and prior characterization data. Using these data, the initial estimates of waste volumes and classes are made and the excavation strategy is developed. The model is continuously refined based upon data collected from both pre-excavation and excavation monitoring.

The location of the site must be known with some degree of certainty to begin excavation. Because the level of confidence among sites in the 100 B/C Area is highly variable, some sites require pre-excavation monitoring to locate the site adequately. The site location system uses non-intrusive sensing techniques to define the location of wastes sites whose locations are not known with sufficient accuracy to initiate excavation. Non-intrusive sensing consists of: large area scans from aircraft using geophysical imaging techniques and ground penetrating radar scans. Overburden gridding (test trenches dug in a grid pattern) is used if all other techniques fail to locate the site.

The excavation monitoring system is used to measure the contaminant levels on the surface to ensure that contamination is not present on the surface. The excavation monitoring detectors are platform mounted and can either be operated from all-terrain vehicles which travel over the excavated surfaces or operated from hydraulic booms for access in areas where the all-terrain vehicle cannot travel. The excavation monitoring system consists of on-line field monitoring instrumentation coupled with near-real time (i.e., less than two hour turnaround time) on-site laboratory analyses.

On-site laboratory analytical methods and operating procedures are designed to achieve two levels of sample turnaround: near-real-time sample turnaround (i.e., two hours or less for analyses needed to guide excavation and waste classification operations and longer turnaround times [24 hours or greater] for QA and site closure samples).

The excavation monitoring system is capable of identifying the approximate contamination boundaries within a waste site as excavation proceeds. However, to minimize the amount of clean material misidentified as contaminated, all material within about 5 ft (on either side) of the contamination boundary (referred to as the fringe area) is subjected to additional monitoring at the classification structure. The classification structure employs the same contaminant detection methods as the in situ system except that for radionuclide detection, more sensitive detectors are used to provide higher resolution. The classification structure provides an array of stationary detectors which monitor the container contents as the truck is driven through the station. At the same time the container contents are being counted with the detectors, a grab sample is collected. Grab samples are necessary for QA analysis and for fringe material which potentially contains contaminants such as organics or transuranic constituents. The grab sample is sent to the on-site laboratory for analysis and the results are recorded in the data acquisition system.

After excavation monitoring and field analysis indicate that the waste site is no longer contaminated, the site closure monitoring is performed. Closure monitoring is similar to the excavation monitoring methods employed during excavation except that higher resolution detectors and longer counting times are used to lower detection limits and improve accuracy. The in situ measurements are obtained over a denser sampling grid to ensure that the site meets the closure criteria and the number of grab samples obtained for laboratory analyses to confirm contaminant levels is sufficient to provide a 95% confidence that the cleanup levels have been achieved.

The on-site laboratory analysis consists of identification and quantification of all site contaminants of concern (COC). These analyses are performed to meet contract laboratory program (CLP) equivalency to ensure that an accurate and defensible record of site conditions is obtained.

If closure monitoring and analysis indicate that cleanup levels have not been achieved, additional excavation is conducted to remove the remaining contamination, if such removal is possible. If not possible, then further action is deferred pending additional evaluation and consultation with the regulatory agencies.

Support Facilities

The office complex is provided on-site to support the 100 B/C remediation activities. The office complex consists of office trailers and trailers which house change facilities for both male and female operations personnel. Trailers are also provided to house a lunch room, medic/first aid station, and the data acquisition system. The remainder of the area is designated for personnel parking.

Office facilities include a change trailer located in the office complex where shift workers change into work clothes. Two personnel decontamination trailers are provided, one near the office area and one on the west side of the 100 B/C exclusion area for changing into and out of radiation protection clothing.

Equipment such as haul trucks, idle excavation equipment, containers, and miscellaneous parts and equipment are staged in a graded and compacted equipment staging area located east of the 105-B Reactor Building. All haul trucks and mobile equipment not assigned to specific excavations are parked in this area during the off-shift hours. Haul trucks, water trucks, the fuel truck, and maintenance vehicles are serviced on a routine basis at the equipment staging area. Heavy equipment used in excavation, reclamation, and road maintenance are typically maintained at the site of their operations.

Off-Site Support Services

Off-site support services are defined as those which are not provided from within the 100 B/C Area, i.e., are provided by other entities or organizations at other Hanford locations or are provided from entities outside of Hanford. These off-site services are listed as follows:

- emergency and security - fire protection, medical services, security monitoring
- communications - telephone, mail, radio, computer
- maintenance - rail facility, transport vehicle, field instruments
- sanitation - janitorial, refuse, portable toilets, non-contaminated sanitary waste removal, laundry
- miscellaneous - mask/small equipment decontamination, training, dosimetry, office supplies, utilities, accounting, procurement, human resources.

Utilities

The site utilities include:

- water and wastewater systems
    - potable water supply consisting of raw water filters and a chlorinator
    - sanitary wastewater holding tanks
    - equipment decontamination facility water supply and wastewater treatment systems consisting of raw water supply from the export water line and settling tanks to clarify wastewater from the decontamination system

- electrical power tie-ins and new distribution stations
- telephone/computer utilities consisting of new fiber optic lines.

Site Reclamation and Closure

After the waste sites are closed, they are backfilled and the sites regraded or recontoured and revegetated.

The total void space produced by the excavation is approximately 4.2 million LCY. However, the final grading will require about 3.2 million LCY of backfill. Backfill stored in on-site stockpiles will supply about 2.2 million LCY, leaving a shortfall of about 1.0 million LCY. The available fill is used to backfill the smaller sites as a first priority. The fill shortfall is made up during reclamation of the large sites and burial grounds by regrading material close to these excavations in a cut-and-fill type operation to obtain the necessary amount of cover. A number of pre-existing spoil piles, generated during construction activities, are used in this operation. Final site contours closely follow original topography or topographic features typical of the geographic setting of the area.

Backfilling is accomplished by replacing excavated material in lifts and compacting to minimize the amount of potential subsidence. Compaction requirements depend on the material properties. The target density and moisture content for backfill should be near that of the surrounding undisturbed material.

Expandability

Because of the uncertainties which exist with regard to areal extent of contamination, it is possible that the actual volumes to be removed are greater than the probable volumes estimated. Actual volumes will not be known until sites are excavated. Thus the design must provide contingencies for expandability. These contingencies are incorporated in two ways:

- providing excess capacity or capability in the specification of equipment systems and facilities, i.e., providing some degree of "overdesign" to allow productivity increases without adding new systems
- providing sufficient space such that additional equipment or facilities can be added at a later date if needed.

Contingencies for expandability which have been incorporated into the baseline design are listed briefly as follows:

- Design excavation rates are 62% greater than the average required for a five year operation.

- Equipment cycle times are conservatively specified by assuming difficult excavation conditions and delays.

- A labor productivity of 5.25 hours per shift is assumed; this can be increased by adding relief workers.

- The operating schedule assumes two shifts, five days per week; additional operating time can be achieve by increasing to a three or four shift operation.

- Spare containers, container handlers, and locomotives are provided.

- Spoil stockpile areas are oversized; plot space is reserved for expansion of piles; pile storage can also be increased by increasing pile height.

- The classification structure includes a spare bay.

- The decontamination facility is expandable by adding portable washing units.

- All on-site support facilities are provided in trailers; expandability is achieved by adding additional trailer units.

Additional Work

Additional data needs and/or evaluations are identified which should be performed prior to or during the definitive design phase. These are briefly listed as follows:

- perform a cultural resources review
- conduct an area wildlife survey
- collect additional soil properties data
- conduct additional site walks and site surveying
- coordinate with D&D activities to assure compatibility
- refine the excavation sequencing plan
- develop a reclamation sequencing plan
- evaluate soil backhaul from ERDF as an option to recontouring
- further evaluate active system interferences
- evaluate container decontamination alternatives
- complete container safety analysis
- evaluate optimized container surveying approaches
- evaluate need for vehicle air supply
- evaluate waste treatment requirements
- define specific utility tie-in points
- define site closure standards and verification requirements
- verify availability of site services.

Cost Estimate

The cost estimate for the 100 B/C remediation project includes all capital and operating and maintenance costs associated with the material handling and transport systems. The estimate does not include costs associated with the analytical system (including equipment, field and laboratory personnel and analytical operating costs) and disposal of waste at the ERDF.

The estimate is prepared using the Micro-Computer-Aided Cost Estimating System developed by the U.S. Army Corps of Engineers.

The general approach to the cost estimate assumes:

- All mobile equipment (excavation equipment and haul trucks) are procured on a lease to own basis such that payments are distributed over the years that the equipment is required.
- Field operations are subcontracted; operating costs are paid only for work performed and for downtime due to weather delays and training.
- All costs are reported in third quarter 1993 dollars.
- No escalation or contingency factors are added.
- Estimate accuracy is judged to be ±15%.

Total estimated cost for the project is $144.6 million or about $73/LCY of contaminated material removed from the 100 B/C Area and transported to the ERDF.

Project Schedule

The project schedule defines major tasks and durations for all activities associated with the material handling and transport system operations. The project schedule begins at vendor receipt of purchase orders for long-lead equipment items. This project start date is June, 1995. The schedule ends at the completion of final closure. This projected date is December, 2001.

Conclusions and Recommendations

Based upon the design analysis, it is concluded that the 100 B/C remedial design approach is viable, provides a high degree of worker safety, and ensures long term protection of human health and the environment as a result of removing sources of contamination from within the vadose zone of the 100 B/C Area. This approach provides:

- an engineered "cradle to grave" approach to site remediation

- integration of remedial actions with existing programs
- elimination of costly and time-consuming site investigations through application of the observation approach.

Based upon the cost analysis, it is concluded that the LSR approach is cost effective. Systems and methods employed are based on current technologies; material handling and transport equipment are readily available commercially. Cost savings are achieved as a result of economy of scale, i.e., unit costs are reduced by using large-scale equipment and by conducting operations in a manner which emphasizes productivity, efficiency, and safety.

Use of the observation approach to site remediation allows focusing of dollars to cleanup rather than investigation. Cleanup of a single area accelerates the timetable for site release and return of the land for other uses.

While LSR is not the only approach to site remediation, it is the only approach which has advanced to the level of design definition provided in this report. Further design work and decision documentation are required before the 100 B/C project can be implemented.

ACRONYMS

AEC-GE	Atomic Energy Commission - General Electric
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
BCY	bank cubic yards
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	contaminants of concern
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
DOT	Department of Transportation
DQO	data quality objective
DRCP	Decommissioning and RCRA Closure Program
Ecology	Washington State Department of Ecology
EMT	Emergency Medical Technician
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ERA	expedited response action
ERDF	Environmental Restoration Disposal Facility
FID	flame ionization detector
FTL	field team leader
FY	fiscal year
GC/MS	gas chromatography/mass spectroscopy
GPR	ground penetrating radar
GPS	global positioning system
HCRL	Hanford Cultural Resources Laboratory
HEPA	high efficiency particulate air
HLAN	Hanford Local Area Network
HP	health physics
HPT	health physics technician
IRM	interim remedial measure
IROD	interim record of decision
IRT	infrared thermography
LAN	local area network
LCY	loose cubic yards
LFI	limited field investigation
LSA	low specific activity
LSR	large-scale remediation
MCA	multi-channel analyzer
MCACES	micro-computer-aided cost estimating system
NaI	sodium iodide

ACRONYMS (cont)

NHPA	National Historic Preservation Act
NQA	nuclear quality assurance
O&M	operating and maintenance
OSHA	Occupational Health and Safety Administration
PID	photoionization detector
PO	purchase order
PPE	personnel protective equipment
PSAR	Preliminary Safety Analysis Report
PSE	preliminary safety evaluation
QAPjP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
SEP	safety evaluation for packaging
SSO	site safety officer
Tri-Party Agreement	Hanford Federal Facility Agreement and Consent Order
TRU	transuranic
UMTRA	Uranium Mill Tailings Remedial Action
WHC	Westinghouse Hanford Company
WIDS	Waste Information Data System
XRF	X-ray fluorescence

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1.0 INTRODUCTION

From 1943 until 1990, the primary mission of the Hanford Site (Hanford) was to produce nuclear materials for the nation's defense. Waste disposal activities associated with this mission resulted in the creation of more than 1,000 past-practice waste sites. The remediation of these sites forms the Hanford Environmental Restoration Project, a Major Systems Acquisition funded by the U.S. Department of Energy (DOE). Remediation of these sites, which have been grouped into operable units, is governed by either the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or the Resource Conservation and Recovery Act (RCRA)[1]. The waste sites are contaminated with either radioactive constituents, chemical constituents or combinations of both. Contamination from some of these sites has migrated into portions of the Hanford groundwater.

Investigation and remediation of the past-practice waste sites is processed according to the terms set forth in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989), initially signed in 1989 by the DOE, the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology). This agreement grouped the waste sites into 78 operable units, each of which was to be investigated and remediated separately under either the CERCLA or RCRA programs, depending upon the designation of the operable unit. Currently a major milestone of the Tri-Party Agreement calls for completion of remediation at all past-practice operable units by the year 2018.

Since the Tri-Party Agreement was signed, studies have been performed which indicate that the costs of completing investigations and remediation as planned are very large and the time required for implementation could exceed the deadline. For this reason, additional studies were undertaken to identify a faster and less costly approach to achieving the cleanup objectives of the agreement. These studies resulted in an alternate approach to Hanford remediation, referred to as "macroengineering," but which was subsequently renamed "large-scale remediation" (LSR). In this approach, remediation is conducted on a large scale, i.e., by aggregate area rather than by operable unit, using conventional techniques commonly employed in the construction industries, but adapted to meet Hanford-specific objectives and conditions. A principal advantage of the LSR concept is the use of concurrent site and waste characterization, i.e., characterization applied as the waste removal proceeds. This avoids the need for much of the time-consuming and costly pre-characterization investigations. The conceptual studies which define the LSR approach for both source unit and groundwater remediation as well as waste disposal are documented in a five volume report entitled *Hanford Past-Practice Site Cleanup and Restoration Conceptual Study* (WHC 1991a-e). The results of the studies indicate that a large scale approach offers potentially significant cost and schedule advantages to the overall cleanup program and should be pursued as a preferred approach.

Following completion of the conceptual studies, further evaluation was required on the technical and economic feasibility of the LSR to consider it as an alternative for source

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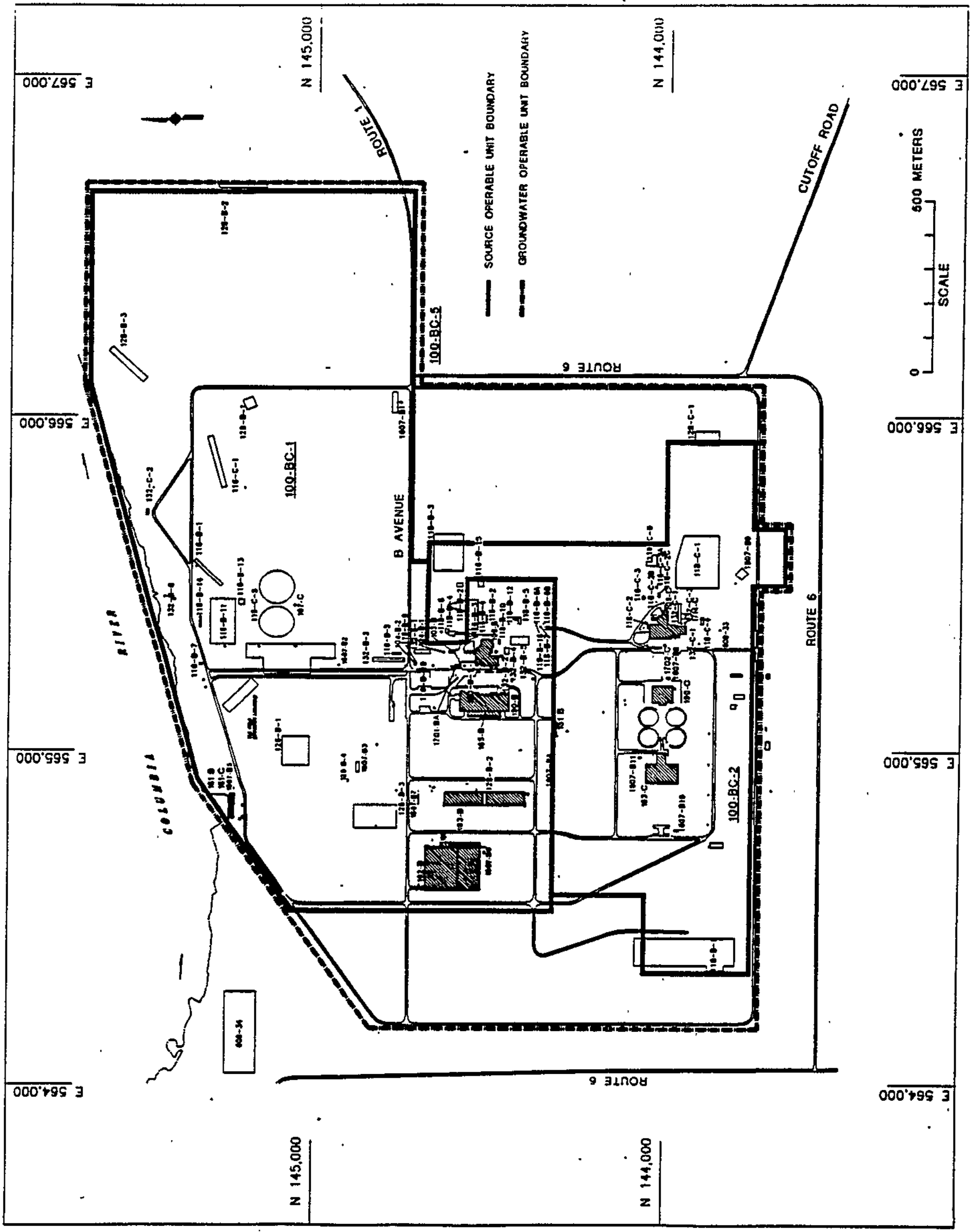
[1] As specified in the Tri-Party Agreement, "Integration of RCRA and CERCLA."

unit remediation. The 100 B/C Area (see Figure 1-1) was selected as the location to apply the LSR concept source unit remediation because substantial waste site characterization data are available for this area. The 100 B/C Area is designated under the Tri-Party Agreement as a CERCLA past-practice area. In the Tri-Party Agreement, the 100 B/C Area is subdivided into three operable units: two source operable units (100-BC-1, 2) and one groundwater operable unit (100-BC-5). The EPA is the lead regulatory agency for oversight of this area.

The 100 B/C remedial design will require design of material handling, analytical, and transportation systems. Soil and solid wastes removed from this area will be transported and disposed of in a new engineered disposal site to be constructed in the 200 Area. Design of the disposal facility for the excavated wastes is being handled as a separate project. All systems and facilities will be designed concurrently. The basis for this pre-design report is contained in the *100 B/C Area Environmental Restoration Pre-Design Guidance Document* (WHC 1993a).

This pre-design report will serve as the basis for generating the final design/construction documents (i.e., bid documents) for 100 B/C remediation. This pre-design phase is structured to satisfy the remedial design requirements of CERCLA (preliminary design phase) as specified in the guidance (EPA 1986).

Figure 1-1 100 B/C Area Site Map



2.0 PROJECT DESCRIPTION

The purpose and scope of the project and the pre-design effort are described in Section 2.1 below. Section 2.2 summarizes the results of previous engineering studies which form the basis for development of the pre-design guidance document and for this pre-design effort.

2.1 PURPOSE AND SCOPE

The objectives of this project are to:

- Develop all systems, equipment, technologies and procedures, on a full scale, for characterization, removal, conveyance, and transport of contaminated soil and solid wastes derived from the past-practice waste sites.

- Complete the remediation of all 100 B/C past-practice sites, included within the defined project scope, within the specified time-frame (within six years from start of construction activities).

The systems developed as a result of the 100 B/C remedial design may be refined for sitewide use based on information gathered in this initial implementation phase.

The purpose of this report is to document the pre-design of the material handling and transportation systems for this 100 B/C remedial alternative. Design of analytical systems is not within the scope of this report and is being performed concurrently in a separate project with separate documentation. However, because there are mutual impacts, designs of both the material handling/transportation and the analytical systems are closely coordinated and integrated.

The 100 B/C Area covers approximately three square kilometers (1.1 sq. miles). The specific waste sites that are included within the scope of the pre-design are listed in Table 2-1 and consist of the following:

- Sixty-one past-practice waste sites in the 100 B/C Area as currently identified in the Waste Information Data System (WIDS) database (DOE/RL 1988).

- Buried reactor effluent pipelines between the 105 buildings and outfall structures and associated contaminated soil from pipeline leaks.

In addition to these waste sites, the scope of the 100 B/C remediation includes other structures or newly discovered waste sites and unplanned and/or unreported releases which are not currently listed in the WIDS database and which are not addressed by other programs. The following list presents waste sources which are excluded from this study:

- portions of effluent pipelines extending into the river from the outlet connection of the outfall structure; these river pipelines will be handled by the decontamination and decommissioning (D&D) program

- all facilities, buildings, structures, or other systems which are or will be addressed by other programs such as D&D

- existing active systems such as the water treatment facilities and associated pipelines

- groundwater remediation including the associated aquifer sediments

- river sediments.

The pre-design is divided into three major elements:

1. Design and analysis - Describes existing site conditions, refines estimates of waste volume, evaluates alternatives for excavation sequencing, and describes required systems and site improvements for the recommended sequence.

2. Engineering drawings - Provides plans, profiles, flowsheets, and activity diagrams delineating site improvements, activities, and systems associated with material handling and analysis.

3. Ancillary design - Describes designs for all ancillary systems including decontamination facilities, waste shipping containers, maintenance shops, and site restoration systems; provides an itemized cost estimate and schedule; describes approaches for expandability.

2.2 PREVIOUS ENGINEERING STUDIES

In 1990, a series of studies was initiated by Westinghouse Hanford Company (WHC) to define LSR concepts for Hanford soil and groundwater contamination. In 1991, a more formal conceptual study was performed by a multi-contractor team under WHC direction. This study, which was at the time referred to as the "macroengineering" study, was documented in a five volume report (WHC 1991a-e). Of the five volume set, the summary report *Hanford Past-Practice Site Cleanup and Restoration Conceptual Study, Integrated Study and Summary* (WHC 1991a), provided an overview and summary of the separate study reports for the 100, 200, and 300 Areas and for groundwater cleanup. The 200 Area report (WHC 1991c) also included studies of waste disposal. The 100 Area report entitled *100 Area Past-Practice Site Cleanup and Restoration Conceptual Study* (WHC 1991b) defined and evaluated LSR concepts for Hanford's nine reactor sites. The information produced in this study is the basis for the pre-design guidance for this 100 B/C Area remedial alternative (WHC 1993a). Because the 100 Area conceptual study supports the pre-design effort for 100 B/C remediation, key results have been extracted and are summarized in Appendix A.

Table 2-1 100 B/C Waste Sites (page 1 of 2)

Site Number	Site Name
116-B-1	107-B Liquid Waste Disposal Trench
116-B-2	105-B Fuel Storage Basin Trench
116-B-3	105-B Pluto Crib
116-B-4	105-B Dummy Decontamination French Drain, 105-B Dummy Decontamination Disposal Crib
116-B-5	108-B Crib
116-B-6A	111-B Crib No. 1, 116-B-6-1
116-B-6B	111-B Crib No. 2, 116-B-6-2
116-B-7	1904-B1 Outfall Structure
116-B-9	104-B-2 French Drain
116-B-10	108-B Dry Well Quench Tank
116-B-11	107-B Retention Basin
116-B-12	117-B Crib
116-B-13	107-B South Sludge Trench
116-B-14	107-B North Sludge Trench
116-B-15	105-B Fuel Storage Basin Cleanout Percolation Pit, 105-B Pond
116-B-16	111-B Fuel Examination Tank
116-C-1	107-C Liquid Waste Disposal Trench
116-C-2A	105-C Pluto Crib, 116-C-2
116-C-2B	105-C Pluto Crib Pump Station, 116-C-2-1
116-C-2C	105-C Pluto Crib Sand Filter, 116-C-2-2
116-C-3	105-C Chemical Waste Tanks
116-C-5	107-C Retention Basin
116-C-6	105-C Fuel Storage Basin Cleanout Percolation Pit, 105-C Pond
118-B-1	105-B Burial Ground
118-B-2	Construction Burial Ground No.1
118-B-3	Construction Burial Ground No.2
118-B-4	105-B Spacer Burial Ground
118-B-5	Ball 3X Burial Ground
118-B-6	108-B Solid Waste Burial Ground
118-B-7	111-B Solid Waste Burial Site
118-B-10	Solid Waste Pit
118-C-1	105-C Burial Ground

Table 2-1 100 B/C Waste Sites (page 2 of 2)

Site Number	Site Name
118-C-2	105-C Ball Storage Tank
118-C-4	105-C Horizontal Control Rod Storage Cave
120-B-1	105-B Battery Acid Sump
126-B-1	184-B Power House Ash Pit, 188-B Ash Disposal Area
126-B-2	183-B Clearwells, Demolition and Inert Landfill
126-B-3	184-B Coal Pit, Demolition and Inert Landfill
126-B-4	B Area Brine and Salt Dilution Pits
128-B-1	100 B/C Burning Pit, 100-B Burning Pit
128-B-2	100-B Burn Pit #2, Sand Blast Disposal Pit
128-B-3	100-B Dump Site, Coal Ash and Demolition Waste Site
128-C-1	100-C Burning Pit
132-B-1	108-B Tritium Separation Facility, Aluminum Process Tube Examination Facility
132-B-3	108-B Ventilation Exhaust Stack
132-B-4	117-B Filter Building, Exhaust Air Filter Building
132-B-5	115-B/C Inert Gas Recirculation Facility
132-B-6	116-B-8, 1904-B2 Outfall Structure
132-C-1	116-C, 105-C Reactor Exhaust Stack
132-C-2	116-C-4, 1904-C Outfall Structure
132-C-3	117-C Filter Building
1607-B1	124-B-1, 1607-B1 Sanitary Sewer System
1607-B3	124-B-3, 1607-B3 Sanitary Sewer System
1607-B5	124-B-5, 1607-B4 Sanitary Sewer System, 1607-B5 Sanitary Sewer System
1607-B7	124-B-7, 1607-B7 Sanitary Sewer System
1607-B8	124-C-2, 1607-B8 Sanitary Sewer System
1607-B9	124-C-3, 1607-B9 Sanitary Sewer System
1607-B10	1607-B10 Sanitary Sewer System
1607-B11	1607-B11 Sanitary Sewer System
PIPELINES	Effluent lines from the reactors to the retention basins and from the retention basins to the outfall structures.
600-33	105-C Reactor Test Loop Burial Site
600-34	100-B Bailed Tumbleweed Disposal Site

3.0 EXISTING CONDITIONS

This section provides a description of the 100 B/C Area facilities and waste sites, including a brief history of activities conducted at the site, and current physical characteristics. Appendix B provides a list of all drawings and photographs that were used in the review of existing conditions.

3.1 INDUSTRIAL COMPLEX

3.1.1 History of Activities

The 100 B/C Area consists of the B and C Reactors and their ancillary facilities. The B Reactor, constructed in 1943 and 1944, was operated from 1944 until 1968 with a standby period from March 1946 to June 1948. The C Reactor, constructed in 1951 and 1952, operated from 1952 until 1969. The B and C Reactors were shutdown in 1968 and 1969, respectively, and retired in 1979. In 1992, the B Reactor was placed on the National Registry of Historic Places by the National Park Service.

At the present time, the only active facilities in the 100 B/C Area are the 181-B river pumphouse, 182-B water reservoir and pumphouse, part of the water transport system, and the 151-B primary substation. River water is delivered by export lines to the 200 Area and to other parts of the 100 Area (DOE-RL 1992a). The 1607-B2, 1607-B4 and 1607-B6 sanitary sewer systems are still active to support the active facilities.

Three projects have been initiated since reactor operations were discontinued: an in situ vitrification test project, D&D activities and environmental restoration activities.

The in situ vitrification test project was performed at the 116-B-6A crib in May of 1990 as a technology demonstration. Details can be found in *In Situ Vitrification of a Mixed-Waste Contaminated Soil Site: The 116-B-6A Crib at Hanford* (Luey et al. 1992).

The D&D activities are performed by the Decommissioning and RCRA Closure Program (DRCP). The DRCP is responsible for surveillance and maintenance prior to D&D of surplus facilities. Details on this program can be found in the *Surplus Facilities Program Plan Fiscal Year 1993* (Winship and Hughes 1992).

The environmental restoration (ER) program for the 100 B/C Area is based on the CERCLA process. The CERCLA work for the 100 B/C Area is described in the 100-BC-2, 100-BC-5 and 100-BC-1 Operable Unit Work Plans (DOE-RL 1993a, 1992a, 1992b).

3.1.2 History of Facilities and Waste Sites

The 100 B/C Area facilities and waste sites are identified and described in Table 3-1. This table provides information specific to each facility or waste site and is organized by site number. The table is based on information derived from U.S. Department of Energy - Richland Operations Office (DOE-RL) 1992b, Adams et al. 1984, Atomic Energy Commission - General Electric (AEC-GE) 1964, and Winship and Hughes 1992. Each table column is described as follows:

- Site Number: The WIDS site number is used where available. For the facilities that have not been given WIDS numbers, the original facility number is retained.
- Site Name/Alias: The current site name and any previous known aliases are provided in this column.
- Years in Service: Provides a range of years that the site was in service.
- Original Purpose and Description: Identifies the purpose or use of the site during its service years and provides information on the original physical description of the site such as information on the dimensions, depth below grade, and types of materials.
- Current Physical Description: Provides information on the current physical description of the site such as whether the site has been demolished, backfilled, or mounded and marked.
- Program Information: Indicates whether the site has been included within a specific WHC program; programs include ER or D&D. A date for field activities will be given if available. Refer to Section 4.4.1 and 4.4.2 for information on these programs.

The waste sites and existing facilities are identified on Drawing H-1-80211. Additionally, demolished facilities which may have existing concrete foundations are identified on the same drawing.

3.1.3 Site Location Confidence

The degree of confidence in the locations of waste sites is highly variable. Some site locations are highly certain because some part of the site is above ground and therefore visible. Some sites are entirely below ground, but the site is easily located because of some readily distinguishable surface feature. Some site locations are very poorly defined because there are no surface features and there are inconsistent or lacking records to indicate location.

The location of the site must be known with some degree of confidence to begin excavation. If too uncertain, additional steps must be taken to locate the site with sufficient confidence that excavation can begin.

An analysis of each of the sites within scope was performed to rank the degree of confidence in location based upon available information. The criteria used in performing this analysis are given as follows:

- Criterion 1 - Is the site above ground?

  Sites above ground and/or sites with portions of the waste unit above ground (such as vent pipes or covers) receive a designation of "very high confidence." Below ground sites proceed to Criterion 2.

- Criterion 2 - How well do existing data define the location?

  This criterion considers the following existing information:

  - Drawings: number, date and legibility of drawings; consistency of drawings
  - Documents: number and reliability of documents; consistency among other documents and with drawings
  - Photos: number, date, and quality of photos
  - Indicators: presence of surface indicators such as pipes, manholes, or markers; ability to triangulate with existing structures
  - Interviews: interview source, source qualifications, and consistency of interview information with documented information
  - Topography: presence of topographic features that may indicate site location such as vegetation changes or disturbed areas.

Results of the confidence evaluation are given in Table 3-2. For each site, the table notes the confidence designation and the basis for the designation. Below ground sites receive confidence designations of either "confident" or "not confident." A "confident" designation indicates that existing information is sufficient to guide the start of excavation operations. Structures which have been demolished and buried in the D&D program are considered to be sufficiently located ("confident" designation) because D&D activities generally buried debris in place at the location of the structure and because a report exists detailing each D&D activity. Sites with a confidence designation of "not confident" will be considered for pre-excavation monitoring, i.e., geophysical and other methods used to locate the site. Pre-excavation monitoring is discussed in Section 6.1.2.

3.2 ROAD AND PAVING NETWORK

The current road network provides adequate access to the 100 B/C Area. The existing road network is shown in Drawing H-1-80212. The network is logistically divided into two areas; the exclusion area and the 600 Area. The exclusion area is defined as the area contained inside the fencing. The remaining area is defined as the 600 Area.

The exclusion area is maintained by the Inactive Facilities Surveillance and Maintenance Organization. This organization conducts activities within the exclusion area several times a month and regularly monitors the road condition. Road maintenance occurs on an as-needed basis.

The 600 Area is maintained by the Roads and Grounds Maintenance for 600 Area Organization. These roads are inspected every two months with the exception of the winter months. Maintenance is scheduled based on the inspections.

3.3 INFRASTRUCTURE

The existing infrastructure within the 100 B/C Area includes active and inactive utility systems as identified in the following drawings:

- H-1-80213 - identifies the raw, sanitary, filtered, and fire water lines
- H-1-80214 - identifies sewer, process sewer, sanitary sewer, and reactor effluent lines
- H-1-80215 - identifies electrical and telephone lines.

3.4 RAILROAD TRACK

The 100 B/C Area contains approximately 13 km (8 mi) of railroad track as shown in Drawing H-1-80212. Most of these tracks have not been actively used for some time, but have received some maintenance during the course of site wide rail activities. The rails are all pre-1950's manufacture, some dating back before 1900.

Westinghouse Hanford Company conducted a field investigation of rail lines proximate to the 100 B/C Area (WHC 1993b). The results of that investigation indicate that several styles of steel rail are present. To accomplish a smooth transition between types of rail, compensation plates were commonly installed at the union of the two different rail styles. Many of the compensation plates have deteriorated beyond their functional limit, thus requiring fabrication and replacement with new plates. The investigation also found that many ties have decayed and require replacement. Additional detail pertaining to the rail system assessment is given in Section 6.2.3.

3.5 EASEMENTS AND RIGHTS OF WAY

The DOE-RL is not aware of any easements or rights of way in the 100 B/C Area.

3.6 OWNERSHIP

The Hanford Site, which includes the 100 B/C Area, is owned by the United States as defined in Article V of the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989)

3.7 LANDFORM CHARACTERISTICS

3.7.1 Topography

The 100 B/C Area lies on an essentially flat semi-arid bench south of the Columbia River. A topographic map of the area is shown in Drawing H-1-80216. The elevation of the area ranges from approximately 150 m (490 ft) along the southern border to 122 m (400 ft) at the river. The average slope across the site is approximately 1%. Erosion has created a steep embankment near the river that ranges from a 10% to 40% drop (DOE-RL 1992a).

There are five vertical control benchmarks and one horizontal control benchmark in and around the 100 B/C Area. Information on the benchmarks is available by contacting the Environmental Data Management group at WHC.

3.7.2 Geology

The geologic description of the Hanford Site and the 100 B/C Area is presented in Section 2.2 of the 100-BC-5 Work Plan (DOE-RL 1992a). The 100 B/C Area is underlain by the Columbia River Basalt Group, the Ringold Formation, the Hanford formation, and surficial deposits. A generalized cross section of the Hanford Site is shown in Figure 3-1 (Lindberg 1993). A 100 B/C specific cross section is shown in Drawing H-1-80218. The geologic area of interest primarily includes the surficial deposits and Hanford formation.

The surficial deposits are sporadically located above the Hanford formation. The deposits include the Burbank loamy sand, Ephrata sandy loam, and Ephrata stony loam. Each is typically silty to sandy and gravelly and is underlain by gravelly material of the Hanford formation. The Ephrata stony loam is specifically associated with glacial outwash debris which includes boulders up to several feet across in some areas (DOE-RL 1992a).

The next geologic formation is the Hanford formation. The gravel-dominated facies predominates in the Hanford formation throughout the area. The sand-dominated facies occurs locally in a few intervals. Significant silt-dominated facies are not apparent. Boulder gravel is often found in the upper 6 to 15 m (20 to 50 ft). The Hanford formation varies in thickness from over 31 m (100 ft) in the southern and southeastern portions of the 100 B/C Area to <15 m (50 ft) near the Columbia River in the northern and northwestern portions of the area (see Figure 3-2). The reduction in the thickness appears to be quite uniform from the southeast to northwest (Lindberg 1993).

The Ringold Formation directly underlies the Hanford formation gravels. Figure 3-3 provides a contour map of the upper Ringold Formation surface for the 100 B/C Area.

3.7.3 Hydrogeology

The vadose zone beneath the 100 B/C Area includes some minor backfill in limited areas, surficial deposits, the Hanford formation, and the uppermost part of the Ringold Formation (Figure 3-1). The vadose zone varies in thickness from about 17 m (55 ft) to over 31 m (100 ft). The vast majority of the vadose zone lies within the gravel-dominated facies of the Hanford formation.

Groundwater contours for June 1992 and September 1992 are shown on Figure 3-4 and Figure 3-5, respectively. June 1992 represents high groundwater levels and September 1992 represents low groundwater levels.

3.7.4 Surface Water Hydrology

The 100 B/C Area does not currently include natural surface water areas, but is bordered on the north by the Columbia River. The water levels of the Columbia River fluctuate on a daily and monthly basis. The mean high water levels for the water years 1980-1991 are shown in Table 3-3. The water level is 124.7 m above mean sea level (amsl) at the 100 year flood and 125.9 m above sea level at the standard project flood.

The average annual precipitation for the Hanford Site, measured at the Hanford Meteorological Station, is about 160 mm. Most of the 160 mm evaporates, resulting in small amounts of water available for runoff or infiltration (DOE-RL 1992a). The drainage pattern for the runoff follows the general slope of the land and drains from the southern boundary northward into the Columbia River.

There are two wetland areas located to the west of the 100 B/C Area. In addition, there is the 182-B concrete reservoir which supports the export water system. These areas are not expected to be impacted by the proposed activities.

3.7.5 Material Properties

Size Analysis - Assumed soil grain size distribution for design is given as follows. This size analysis is reported in the pre-design guidance document (WHC 1993a).

Fraction	Size	Wt%
Boulders	30.5 to 61.0 cm	5.0
Large cobbles	15.2 to 30.5 cm	13.5
Small cobbles	0.9 to 15.2 cm	31.5
Fine pebbles	0.2 to 0.9 cm	5.7
Very fine pebbles	to 2 mm	3.7
Very coarse sand	to 1 mm	7.8
Coarse sand	to 0.5 mm	6.6
Medium sand	to 0.25 mm	9.0
Fine sand	to 0.125 mm	5.0
Very fine sand	to 0.0625 mm	3.9
Silt	to 0.0313 mm	2.9
Pan	to 0.0038 mm	5.4

Soil Bulk Density - Soil bulk density (wet) is needed to estimate material weights. Soil bulk density has not been directly measured. No reliable data are available upon which to estimate bulk density of excavated soil. It is planned that direct bulk density measurements and moisture content be made during an upcoming excavation test planned for late in fiscal year (FY) 1993. In the absence of data, handbook values have been used as a design basis. The *Caterpillar Performance Handbook* (Caterpillar 1992) lists a sand/gravel mixture as 107 lb/ft^3 (dry) and 126 lb/ft^3 (wet). For conservatism, the higher value is used in estimating excavated material weights.

Material Swell Factors - Swell factors for each type of waste are assumed as follows (WHC 1993c):

- soil - 18%
- buried waste - 30%
- concrete - 60%
- other metals (e.g., pipelines, steel retention basins) - 30%.

Slope Stability - Excavation side slopes for safe operation are specified at 1.5 horizontal (H) to 1.0 vertical (V) based on slope angles observed to be stable in historical photos and in more recent Hanford excavations. These slopes comply with Occupational Safety and Health Administration (OSHA) mandated slope design for excavations <20 ft in depth (29 Code of Federal Regulations [CFR] 1926 Subpart P). However, slopes for excavations exceeding 20 ft in depth must be designed by a registered professional engineer. This design requires a slope stability analysis using the following input data:

- soil shear strength parameters, such as soil cohesion and internal friction angle
- soil unit weight, dry and saturated
- soil water content
- groundwater levels.

With exception of groundwater levels, data are not available for any of the input parameters needed for a stability analysis. It is recommended that these data be obtained in future investigations and that the slope stability analysis be performed as part of the definitive design effort.

<u>Soil Angle of Repose</u> - WHC measured the angle of repose of a pile of dry excavated soil (IT 1993). The angle varied between 27 and 34 degrees (1.5H:1.0V to 2.0H:1.0V). Design angle for all stockpile slopes is assumed to be 2.0H:1.0V.

<u>Other Data</u> - To establish backfill compaction requirements, the following data are needed:

- maximum dry density and optimum water content as determined by Proctor density testing

- in situ bulk density and natural moisture content as target values for recompaction.

3.8 AREA ECOLOGY

The 100 B/C Area ecology consists of vegetation and wildlife. Biological assessments have been conducted for both wildlife and plant species (Fitzner et al. 1992 and Sackschewsky 1992, respectively). Ecological field investigations are summarized in Landeen et al. (1993). The following discussion briefly describes the existing conditions and areas of special interest.

3.8.1 Area Vegetation

The 100 B/C Area vegetation is primarily described as two communities, the riparian and cheatgrass. Figure 3-6 portrays the distribution of these communities as well as other communities for the Hanford Site (Weiss et al. 1992).

A plant community analysis was conducted and documented by M. R. Sackschewsky et al. in the *Fiscal Year 1991 100 Areas CERCLA Ecological Investigations* (1992). The riparian community is described as the region immediately adjacent to the Columbia River. The region upstream from the 100 B/C Area is dominated by a thick stand of willow, with interspersed patches of Reed's canary grass, sedges and thickspike wheatgrass, and goldenrod. Small wetland areas are present in this vicinity. Downstream from the 100 B/C Area is a cobble shoreline with relatively sparse vegetation. A number of white mulberries, elms, and junipers are present with an understory of scattered tumblemustard and cheatgrass.

The plant community bounded by the 100 B/C fence is almost entirely made up of the alien species of tumblemustard, Russian thistle, and cheatgrass. Modest stands of gray rabbitbrush are present, as well as a few scattered bunchgrasses (mostly sand dropseed). This area is described as the cheatgrass community (Sackschewsky et al. 1992).

The 100 B/C Area contains one state endangered and four state sensitive plant species as listed in Table 3-4. The state endangered plant species has also been listed as a federal candidate. Currently, there is no legal protection provided to any state listed plant species or to federal candidates (Sackschewsky 1992). However, WHC's best management practices indicate that field activities are to take all reasonable measures to conserve and preserve existing plant habitat (WHC 1988a).

3.8.2 Area Wildlife

Wildlife studies have been completed on a 100 Area-wide basis; therefore, information specific to the 100 B/C Area is not available. A summary of the field investigations can be found in Landeen et al. (1993). A summary of the federal and state threatened and endangered wildlife species are presented in Table 3-5. Currently, there is no legal protection provided to any state listed or federal candidate species. However, WHC's best management practices indicate that field activities are to take all reasonable measures to conserve and preserve existing habitat (WHC 1988a).

3.9 CULTURAL RESOURCES

In compliance with Section 106 of the National Historic Preservation Act (NHPA), and at request of WHC, the Hanford Cultural Resources Laboratory (HCRL) conducted an archaeological survey of the Hanford 100 Reactor Areas (Chatters et al. 1992). This survey was conducted in FY 1991 as part of a comprehensive cultural resources review of the 100 Area CERCLA operable units in support of CERCLA characterization activities. The work included a literature and records review and pedestrian survey of the project area following procedures established in the Hanford Cultural Resources Management Plan (PNL 1989).

Two sites (45BN446 and H3-17) and a single isolated artifact (45BN430) were located within the 100 B/C Area. Site H3-17 is located on the high terraces occupied by the reactor facilities and may be affected by CERCLA remediation. Site 45BN446 is at risk because it may be located near frontage roads or launch facilities and may be indirectly affected.

The significance of all sites discovered to date needs to be evaluated before site remediation can be initiated. The DOE is considering negotiating a programmatic agreement with the Washington State Historic Preservation Office, the Advisory Council for Historic Preservation, and affected native American Tribes to aid in the mitigation of effects to significant historic properties that are within or affected by contamination from CERCLA operable units. All work and road building associated with CERCLA characterization and/or remediation of the 100 Areas needs to be reviewed by HCRL and DOE personnel and plans adjusted to avoid impacts to cultural resources whenever possible.

Figure 3-1 Comparison of Geologic and Hydrologic Units

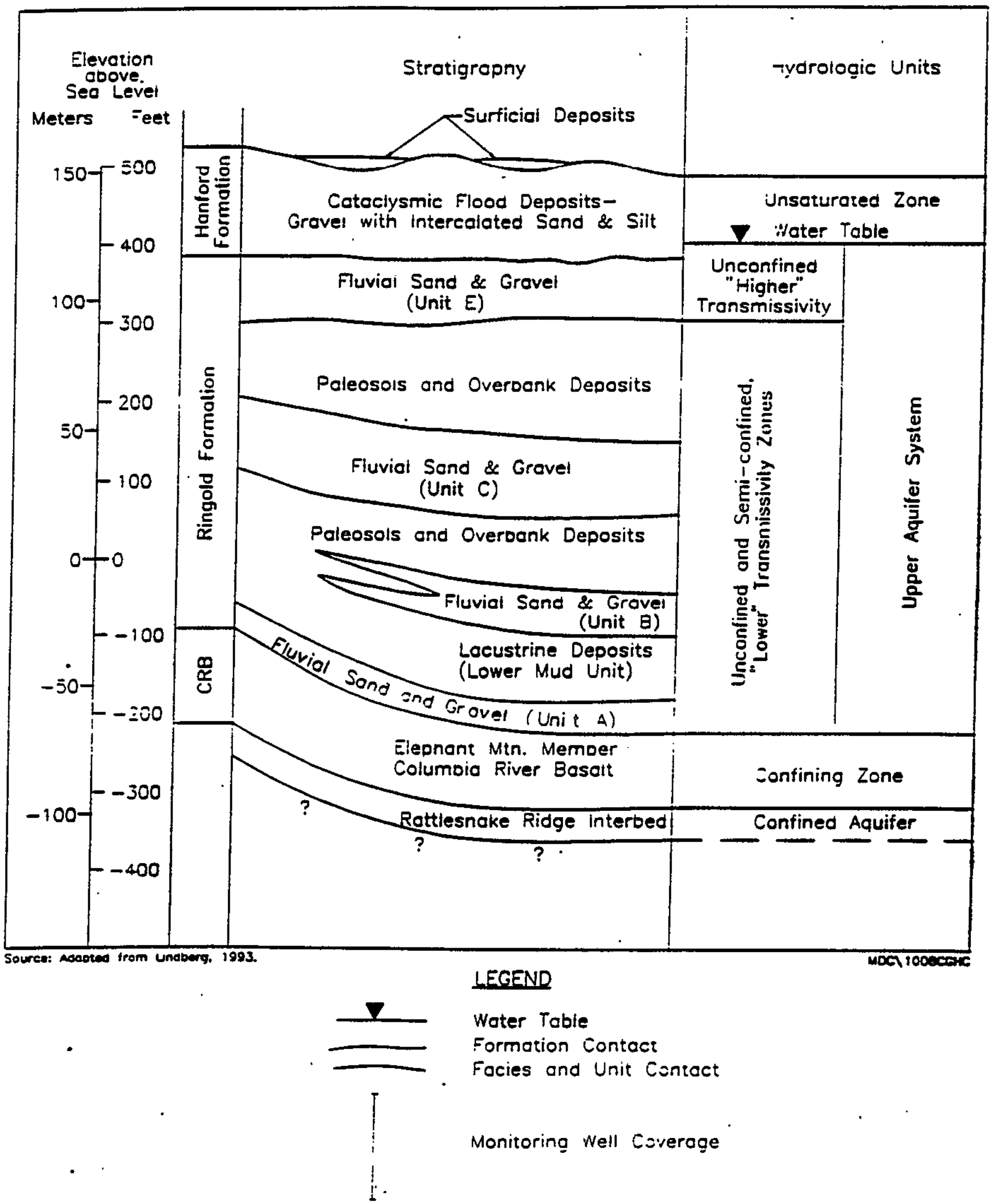


Figure 3-2 Isopach Map of the Hanford Formation

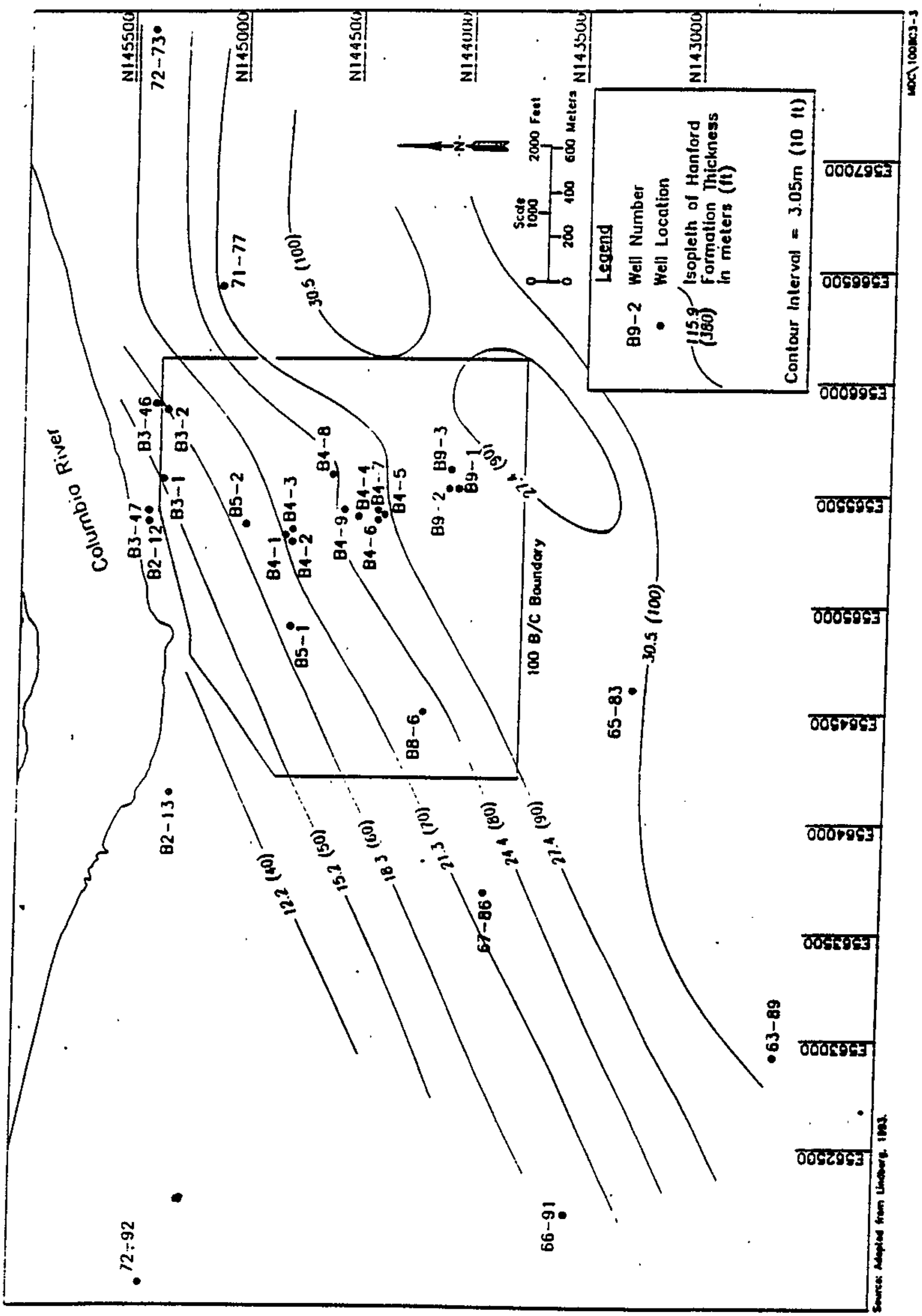


Figure 3-3 Contour Map of the Upper Ringold Formation

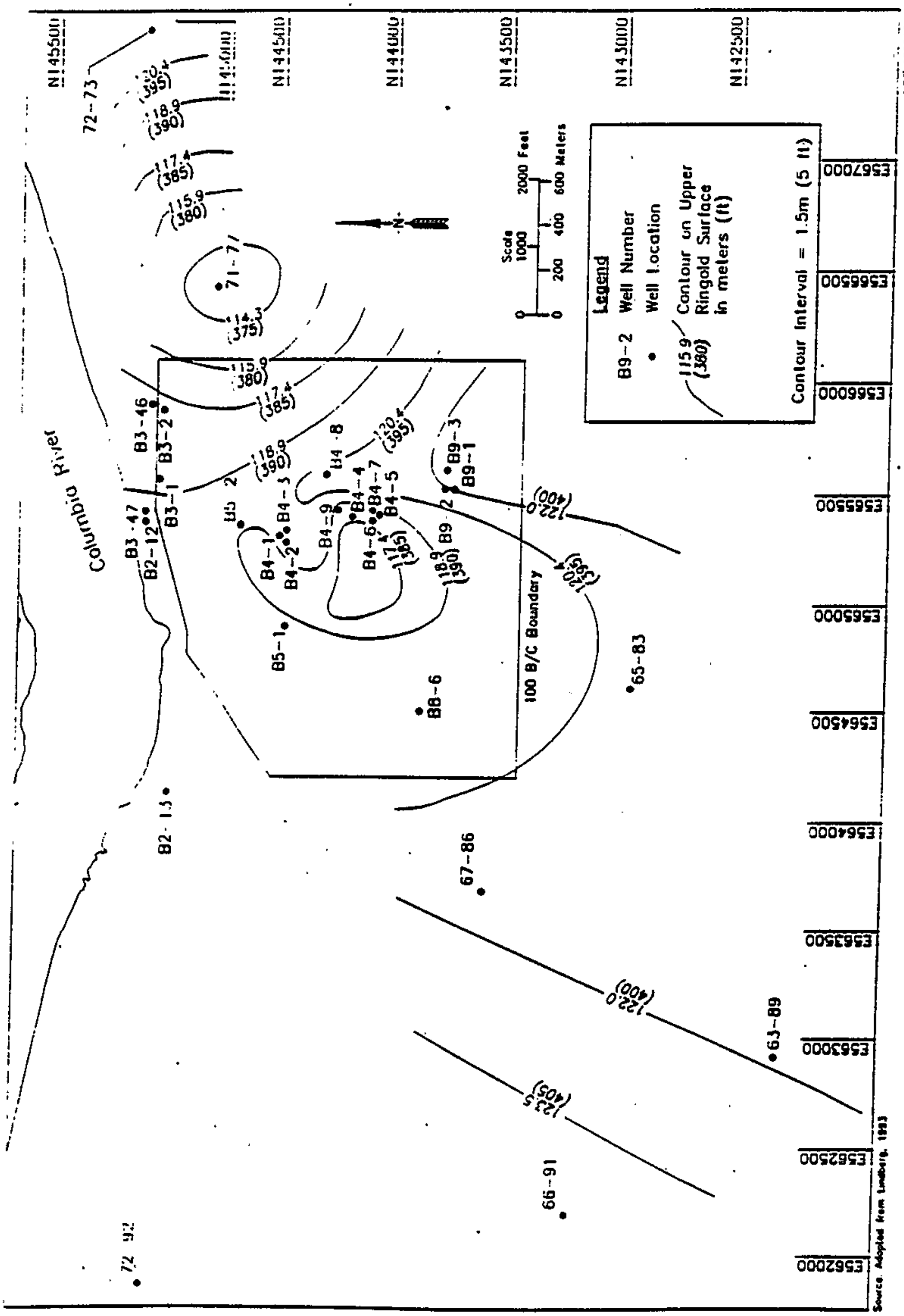


Figure 3-4 June. 1992 Groundwater Contours

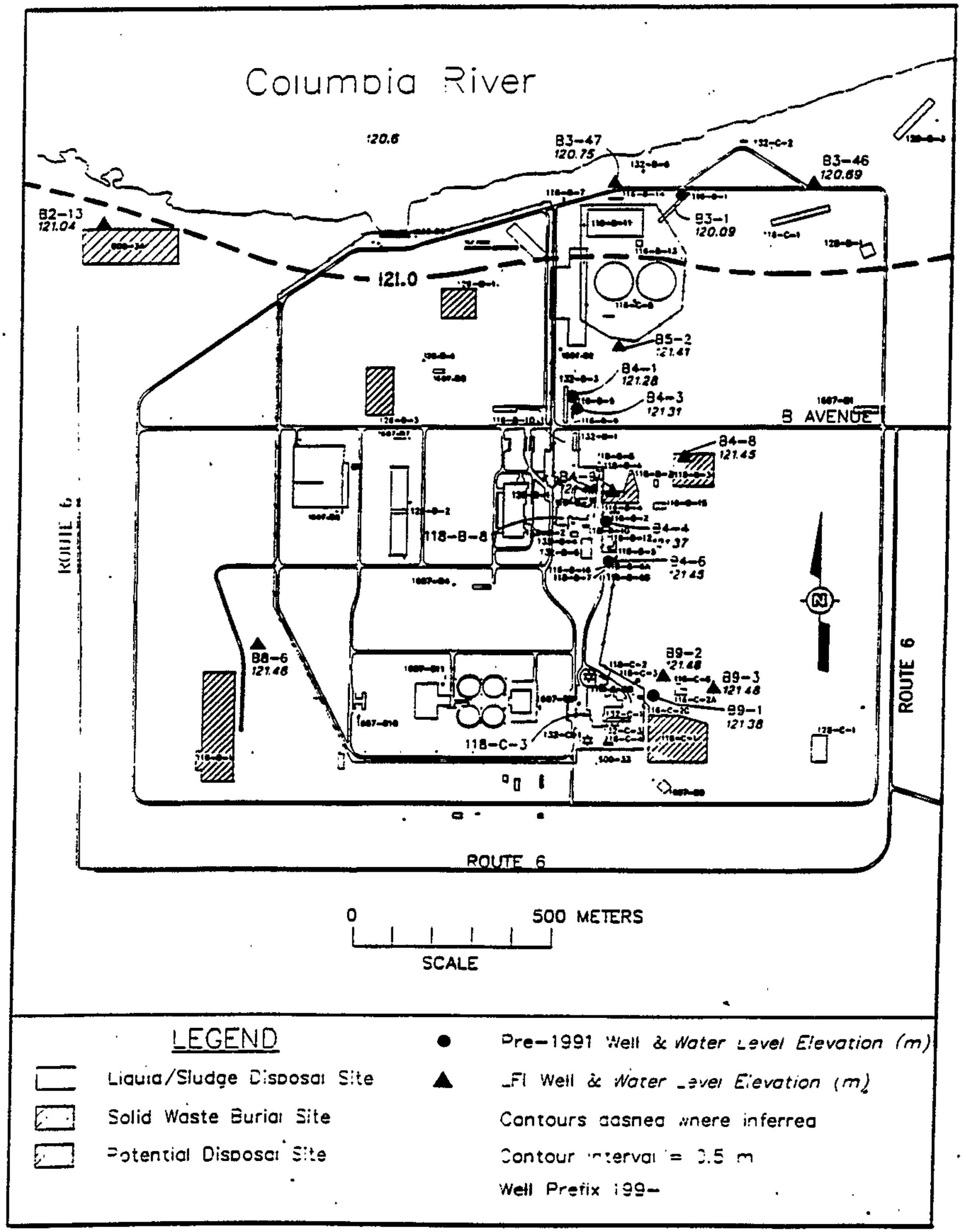


Figure 3-5 September, 1992 Groundwater Contours

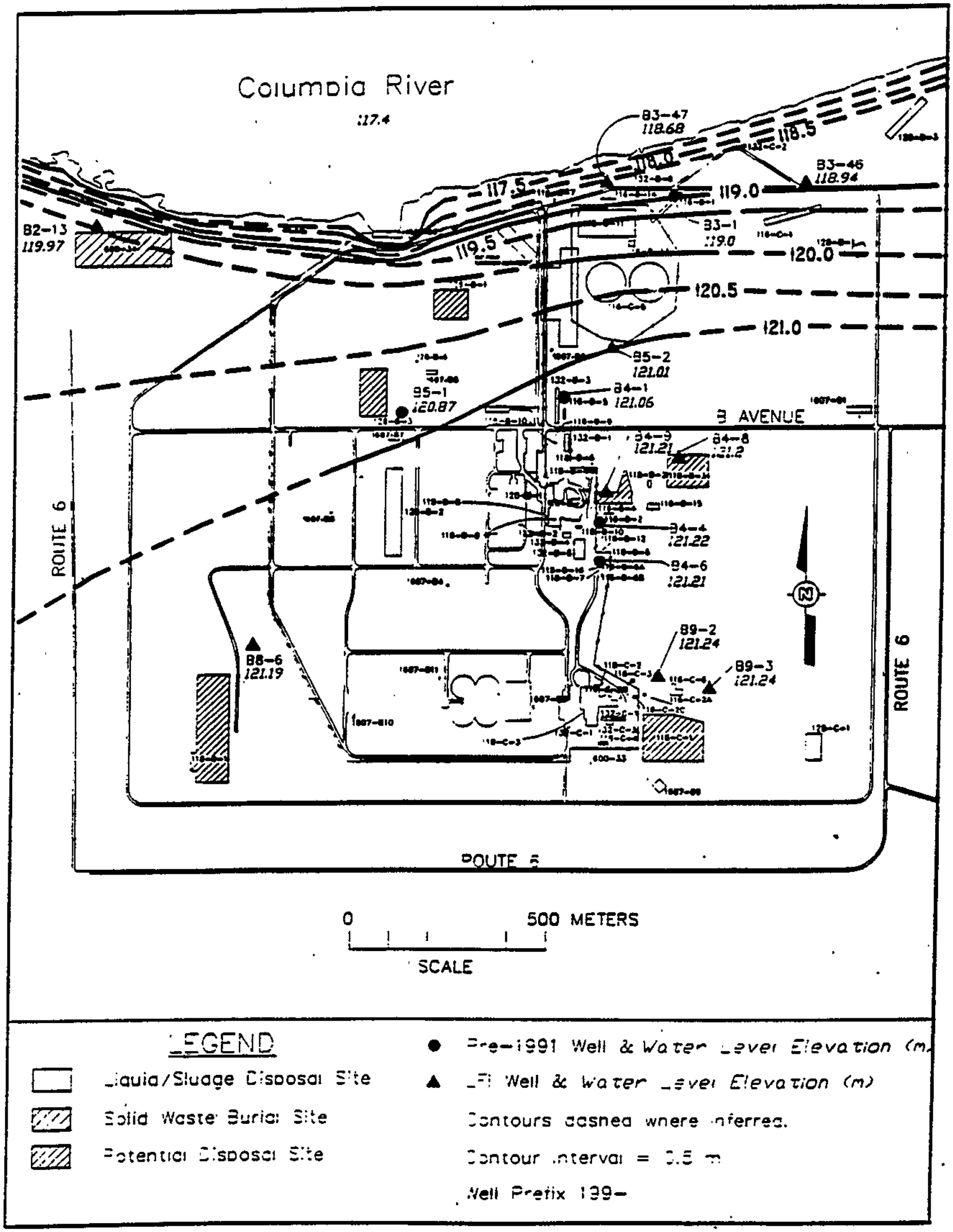
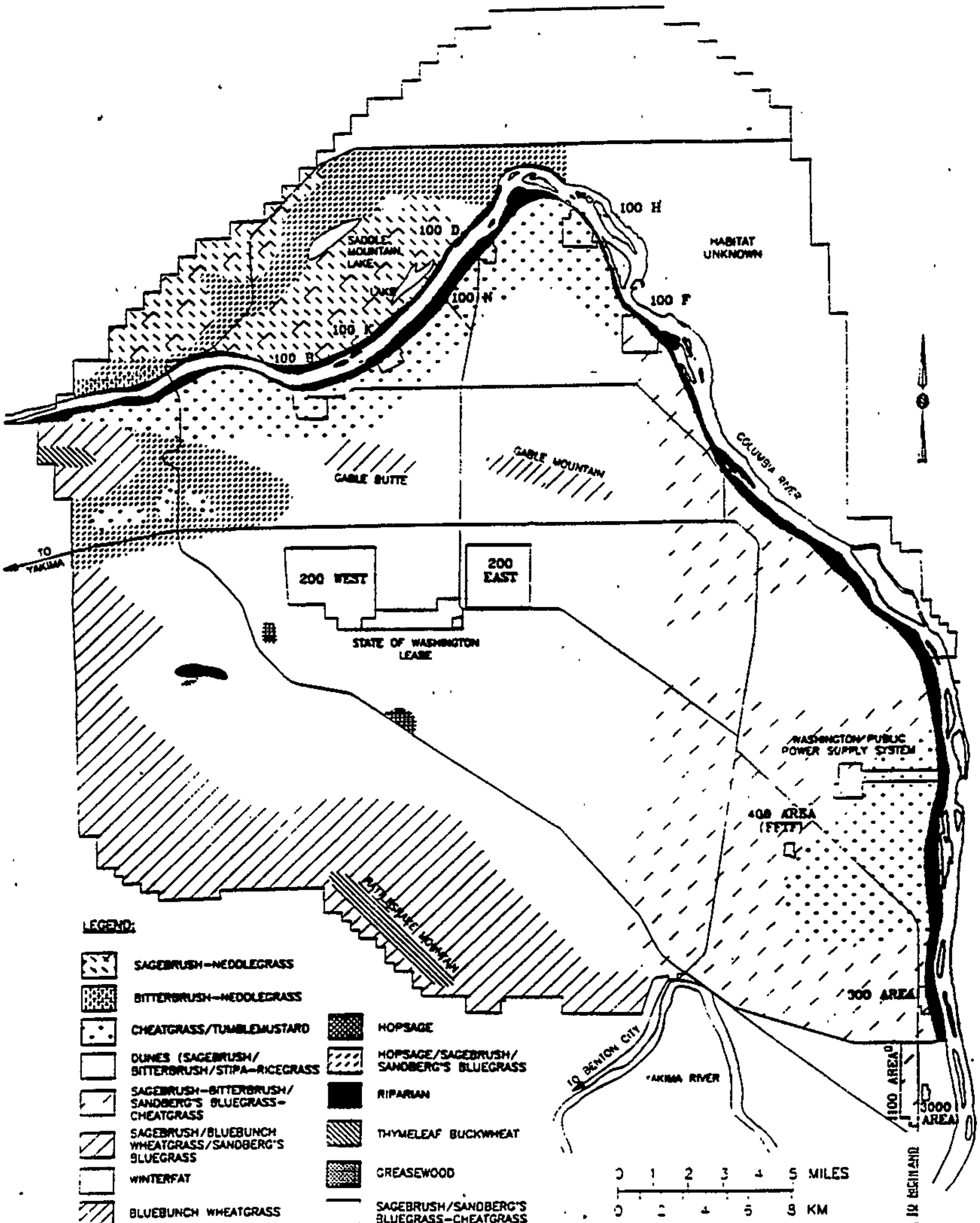


Figure 3-6 Hanford Site Plant Community Types



Source: Weiss, et. al 1992

Table 3-1 100 B/C Area Waste Sites and Facilities (page 1 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
103-B	Fresh Metal Storage Building	1944-1968	Pallet storage of fuel elements before use in the reactor. Single story reinforced concrete block structure on concrete block floor. South end of building has a 1.5 m high (5 ft) reinforced concrete loading platform. The dimensions are 16 x 8 x 4 m (53 x 27 x 14.5 ft).	Same as original.	D&D, 1998
104-B-1	Tritium Vault, Annex to 108-B	unknown	Original purpose and description unknown. 130 square foot concrete block structure.	Same as original.	D&D, 1998
106-B	Contaminated Equipment Storage Building	1944-unknown	Original purpose unknown. Galvanied iron Quonset hut with plywood floor.	Demolished.	D&D, 1984
110-B	Gas Storage Station	1944-unknown	Storage helium and carbon dioxide for use in the 115-BC Gas Recirculation Facility (132-B-5). Consisted of several 24 inch diameter x 80 inch long high-pressure helium tanks and four large tanks for carbon dioxide storage.	Demolished.	D&D, 1984
111-B	Fuel Examination and Decontamination Station	1944-1968	Fuel examination station with two underground fuel examination pits. It evolved into an equipment decontamination facility and shop for working on low-level contaminated reactor components. Wooden frame structure on a concrete foundation, asbestos siding, wood roof with tar and gravel. Dimensions: 24 m x 19 m x 4 m high (80 ft x 61 ft x 14.5 ft). The two underground storage pits are still in place and the dimensions are unknown.	Structure demolished. Pits still in place. Pit dimensions unknown.	D&D, 1984
116-B-1	107-B Liquid Waste Disposal Trench	1946-1955	Received effluent overflow from the 116-B-11 retention basin at times of high activity due to fuel element failure. Dimensions: 9 x 108 m base footprint, 5 m deep (30 x 355 ft, 15 ft), 1:1 side slope.	Same as original. Filled to grade with 15 feet of clean soil.	ER
116-B-2	105-B Fuel Storage Basin Trench	1946-1946	Received water from the 105-B fuel storage basin after a fuel element was accidentally cut in half. Excavation: 3 x 23 m base footprint, 5 m deep (10 x 75 ft, 15 ft), 1:1 side slope.	Same as original. Filled with 15 feet of clean soil.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 2 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
116-B-3	105-B Pluto Crib	1951-1952	The crib received effluent from reactor tubes contaminated by failed fuel elements. Excavation: 3 x 3 x 3 m, 1 m below surface (10 x 10 x 10 ft, 3 ft). Possibly shored with railroad ties and filled with gravel.	Same as original. It is marked with a concrete marker flush with the ground.	ER
116-B-4	105-B Dummy Decontamination French Drain, 105-B Dummy Decontamination Disposal Crib	1957-1968	Received spent acid rinse water from the B reactor dummy decontamination facility. A fuel element spacer was termed "dummy". Graded rock and sand bottom and has a curved yellow pipe in the center. 1 m diameter and 6 m deep (4 x 20 ft).	Same as original.	ER
116-B-5	108-B Crib	1950-1968	Received low-level wastes from the contaminated maintenance shop and decontamination pad in the 105-B building and liquid tritium wastes (less than 1 uCi/cc) from the 108-B building. Excavation: 4 x 26 m base footprint, 2 m below surface (16 x 84 ft, 5.6 ft), 1:1 side slope. There is a .1 m (4 in) pipe entering the south end at .3 m (1 ft) below grade.	Same as original.	ER
116-B-6A	111-B Crib #1, 116-B-6-1	1951-1968	Received radioactive wastes from equipment decontamination at the 111-B building decontamination station. Excavation: 4 x 2 x 5 m, 2 m below surface (12 x 12 x 15, 6 ft).	In Situ Vitrification (ISV) technology demonstration was conducted at this site. The ISV block is approximately 4 m (14 ft) below surface. 2 m (6 ft) of the waste site remain unchanged.	ER
116-B-6B	111-B Crib #2, 116-B-6-2	1950-1953	Received radioactive waste from equipment decontamination at the 111-B building decontamination station. 2 x 1 x 2 m, 2 m below surface (8 x 4 x 8 ft, 6 ft).	Same as original.	ER
116-B-7	1904-B1 Outfall Structure	1944-unknown	Cooling water and process sewer water return to the Columbia River. Open concrete sump with associated effluent lines that ran from the sump to approximately mid-channel of the river and a concrete spillway that terminated at the river shore line. 8 x 4 x 6 m deep (27 x 14 x 21 ft).	Same as original.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 3 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
116-B-9	104-B-2 French Drain	1952-1954	Received wastewater from the P-10 storage building drain. 1 m diameter x 1 m deep (4 x 3 ft).	Same as original.	ER
116-B-10	108-B Dry Well/Quench Tank	1950-1968	Received liquid decontamination wastes from the 108-B facility. The unit has a metal manhole type cover. A .04 m (1.5 in) drain line was added in the mid-50's that came from the second floor of the 108-B. 1 m diameter x 2 m deep (3 x 7 ft), 1 m below surface.	Same as original.	ER
116-B-11	107-B Retention Basin	1944-mid 1950s	Provided transient retention of reactor cooling water before its return to the Columbia River. Gross leakage is known to have occurred at this site. Reinforced concrete structure divided into two sections with a central flume running the length of the basin. Sluice gates permitted use of each section alternately. Small wood frame structures at inlet and outlet housed instruments and controls for gates, valves, etc. Dimensions: 70 x 142 x 7 m (230 x 470 x 24 ft) with 45 million liters (12 million gal) capacity. The bottom of the basin is approximately 2 m (5 ft) below grade.	Exterior walls, divider wall, and inlet boxes were demolished and covered with clean fill to a depth of about 1 m (4 ft).	ER
116-B-12	117-B Crib	1961-1968	Received drainage from the confinement system in the 117-B building seal pits. Filled with gravel and covered to grade with clean fill. A large steel vent marks the site. Excavation: 3 x 3 x 3 m, assumed 2 m deep (10 x 10 x 10 ft, 6 ft).	Same as original.	ER
116-B-13	107-B South Sludge Trench	1952-1969	Received sludge from the 116-B-11 retention basin. Dimensions: 15.2 x 15.2 x 3 m (50 x 50 x 10 ft)	Site is now covered with 2 m (6 ft) of soil.	ER
116-B-14	107-B North Sludge Trench	1948-1952	Received sludge from the 116-B-11 retention basin. Dimensions: 36.6 x 3 x 3 m (120 x 10 x 10 ft)	Site is now covered with a 2 m (6 ft) soil mound with concrete markers at the perimeter.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 4 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
116-B-15	105-B Fuel Storage Basin Cleanout Percolation Pit, 105-B Pond	1984-1985	Received processed water from the 105-B Fuel Storage Basin. During the cleaning of this basin, the radiologically contaminated shielding water was processed through a process system that utilized ion exchange columns. Before discharging the water to the unit, composite samples were taken to ensure that radionuclide concentrations were below release criteria given in DOE Order 5480.1. Open, excavated pit, rectangular in shape, 30 x 15 x 2 m deep (100 x 50 x 6 ft). Soil excavated from the center was used as a berm around its perimeter.	Same as original.	ER
116-B-16	111-B Fuel Examination Tank	unknown-1968	Received wastes from equipment decontamination, the 111-B building, and liquid wastes from fuel element spacer decontamination. Constructed of concrete. Dimensions: 3 x 2 x 3 m deep (10.7 x 5.8 x 9 ft).	The floor, foundation, and tank are the only remaining portions of 111-B. It is not known if the tank was backfilled, but it is believed to have been filled with either sand or concrete prior to abandonment of the building. Dimensions are same as original.	ER
116-C-1	107-C Liquid Waste Disposal Trench	1952-1968	Received effluent overflow from the 116-C-5 retention basin at times of high activity due to fuel element failure. Dimensions: 152 x 15 m base footprint, 8 m below surface (500 x 50 ft, 25 ft), 1:1 side slope.	Same as original, filled with soil.	ER
116-C-2A	105-C Pluto Crib, 116-C-2	1952-1968	Received wastes from the decontamination of dummy fuel elements at C reactor, wastes from C reactor irradiated fuel examining facilities, and C reactor rear-face liquid wastes. Contains gravel and sand fill. Dimensions: 5 x 7 x 2 m deep, 6 m below grade. (15.3 x 22.7 x 7 ft, 20 ft). Photos dated 1964 and earlier show the site as an open pit. The crib is located at the bottom of the open pit.	The pit was filled with soil and the monitoring well was extended to the existing ground surface. Dimensions are same as original.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 5 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
116-C-2B	105-C Pluto Crib Pump Station, 116-C-2-1	1952-1969	Purpose was similar to 116-C-2A. Received waste from 105-C and pumped it into 116-C-2C. Concrete structure 3 x 2 x 9 m deep (9.7 x 6.7 x 30 ft).	Same as original. Metal lid is visible from the surface.	ER
116-C-2C	105-C Pluto Crib Sand Filter, 116-C-2-2	1952-1969	Purpose was similar to 116-C-2A. Received waste from 116-C-2B and the effluent went to 116-C-2A. Concrete box filled with sand and gravel. Contaminated water was spread over the surface of the sand filter media by distribution trays. It is covered with concrete shielding slabs. Dimensions: 12 x 5 x 5 m deep (38 x 18 x 18 ft).	Same as original. Concrete lid is visible from the surface.	ER
116-C-3	105-C Chemical Waste Tanks	never used	Originally installed to receive liquid waste from the 105-C Fuel Examination Facility. Two tanks with a 102,330 liters (27,000 gal) capacity. Dimensions unknown.	Same as original. Two standpipes visible from surface.	ER
116-C-5	107-C Retention Basin	1952-1969	Cooling water effluent for decay/cooling prior to release to the Columbia River. System is cross tied to 107-B and handles reactor effluent from both B and C reactors. Two carbon steel tanks, each with a series of steel baffle plates inside to prevent water from channeling across the tank into the discharge line. Dimensions: 100 m diameter x 5 m high (330 x 16 ft).	Same as original with approximately 1 m (3 ft) of soil placed inside the basin.	ER
116-C-6	105-C Fuel Storage Basin Cleanout Percolation Pit, 105-C Pond	1984-1985	Received processed water from the 105-C Fuel Storage Basin cleanout. During this effort, the radiologically contaminated shielding water in the basin was processed through a process system that utilized ion exchange columns. Before discharging the water to the unit, composite samples were taken to ensure that radionuclide concentrations were below release criteria given in DOE Order 5480.1. L-shaped, open excavated pit with approximate side lengths of 30 x 30 x 14 x 15 x 17 x 15 m (100 x 100 x 45 x 50 x 55 x 50 ft) and depth of 2 m (6 ft). Soil was excavated from the center and used as a berm around its perimeter.	Same as original.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 6 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
118-B-1	105-B Burial Ground	1944-1973	The spline silos received metallic wastes. The trenches received general reactor waste from B and N reactors such as aluminum tubes, irradiated facilities, thermocouples, vertical and horizontal aluminum thimbles, stainless steel gun barrels and expendables, plastic, wood, and cardboard. The site consisted of 21 trenches running east and west, 3 trenches running north and south, perforated burials, and spline silos. Perforated burials were generally in excavations shored with railroad ties. Spline silos were metal culverts with a 2 m (5-6 ft) radius. Typically, the trenches had a 91 x 6 m base footprint at a 6 m depth (300 x 20 ft, 20 ft) with a 1:1 side slope and 6 m (20 ft) space between them. Dimensions of the site are 305 x 99 x 6 m deep (1,000 x 321 x 20 ft).	Burial ground has been covered with fill.	ER
118-B-2	Construction Burial Ground #1	1952-1956	Received dry waste from 116-B-11 basin repair work and 115-B alterations. Burial ground contains one long trench running east and west. Trench excavation: 18 x 9 m (60 x 30 ft) base footprint, 4 m (14 ft) deep, and 1:1 side slope.	Burial ground has been covered with a minimum of 1 m (4 ft) of fill.	ER
118-B-3	Construction Burial Ground #2	1956-1960	Received solid waste from the effluent line modification, and reactor-generated solid waste from various modification programs. Burial ground contains many trenches running east and west. Burial ground excavation: 107 x 84 m (350 x 275 ft) base footprint, 7 m (24 ft) deep, and 1:1 side slope.	Burial ground has been covered with a minimum of 1 m (4 ft) of fill.	ER
118-B-4	105-B Spacer Burial Ground	1956-1958	Used for disposal of fuel spacers termed dummy. Burial ground contains six dummy storage pits installed below ground, The pits are constructed of metal culverts 2 m (6 ft) in diameter and 5 m (15 ft) deep.	Same as original.	ER
118-B-5	Ball 3X Burial Ground	1953-1953	Received highly contaminated reactor components (old thimbles, step plugs) that were removed from the B reactor for the Ball 3X system. Burial ground contains one trench 15 x 15 m (50 x 50 ft) base footprint, 8 m (25 ft) deep with a 1:1 side slope.	Burial ground has been covered with 2 m (5 ft) of soil.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 7 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
118-B-6	108-B Solid Waste Burial Ground	1952-1953	Received tritium wastes and tritium recovery process waste, primarily aluminum target cans and lead target melting pots. Burial ground contains two concrete pipes, 5 m (18 ft) long and 2 m (6 ft) in diameter, buried vertically in the ground.	Same as original.	ER
118-B-7	111-B Solid Waste Burial Ground	1951-1968	Received miscellaneous decontamination materials and associated equipment. Excavation: 2 m (8 ft) square and 4 m (13 ft) deep with a 1:1 side slope.	Burial ground has been covered with 2 m (5 ft) of soil.	ER
118-B-8	105-B Reactor Building	1944-1968	Provided housing for nuclear reactor and directly associated equipment used in reactor operations. The building is a light, nonairtight industrial structure of reinforced concrete in the lower portions and of concrete block in the upper. Roof construction is of reinforced concrete or precast concrete roof tile depending on the specific roof area. An extensive ventilation system provides ventilation for personnel comfort and, through controlled pressure zones, air flow for control of the potential spread of radioactive contamination.	Same as original.	D&D, 2007
118-B-9	104-B2 Storage Building, 104-B-2 Tritium Laboratory, Annex to 108-B	1948-1965	Trace amounts of radioactive waste; the building currently contains slightly contaminated reactor components from B and C reactors. Concrete structure about 3 m (10 ft) high with special cells in the floor to store casks used in the Pilot P-10 Program. Structure is estimated to be 34 m^2 (365 ft^2). Cell size is unknown.	Same as original.	D&D, 1998
118-B-10	Solid Waste Pit	unknown	Purpose unknown. Excavation: 15 x 4 m (48 x 18 ft) base footprint, 7 m (23 ft) deep with a 1:1 side slope.	Burial ground has been covered with 1 m (3 ft) of soil. Site has a 1 m (2 to 3 ft) raised mound. Currently fenced with a single chain and marked with underground radiation signs.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 8 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
118-C-1	105-C Burial Ground	1953-1969	Received miscellaneous solid waste from C reactor such as process tubes, aluminum spacers, control rods, soft waste and reactor hardware. Surface dimensions of burial ground are 152.4 x 121.9 m (500 x 400 ft). Burial ground contains may trenches running north and south and six pits. The pit excavation was 3 x 3 m (10 x 10 ft). The trenches were typically 91 x 61 x 6 m (300 x 200 x 20 ft) with a 6 m (20 ft) space between each trench.	Burial ground has been covered with fill.	ER
118-C-2	105-C Ball Storage Tank	1969-1969	Contains highly irradiated boron steel balls from the ball 3X project. The tank is 2 m (6 ft) diameter and 2 m (5 ft) deep and has two visible standpipes.	Tank has been covered with a shielding mound 1 m (~2 ft) above ground level.	ER
118-C-3	105-C Reactor Building	1952-1969	Reactor building. Similar to 105-B, except for larger building size and minor variations in layout.	Same as original.	D&D, 1999
118-C-4	105-C Horizontal Control Rod Storage Cave	1950-1969	Horizontal control rods, miscellaneous unknown components are currently in the cave. Storage cave is approximately .3 x 1 x 16 m (1 x 4 x 54 ft). Cave is covered with a 1 m (4 ft) mound of earth with base dimensions of 16.5 x 7.8 m (54 x 25.8 ft).	Same as original.	ER
120-B-1	105-B Battery Acid Sump	1944-1969	Received unknown amounts of sulfuric acid from spillage during use and servicing of an emergency power battery bank inside of the 105-B building. Concrete-lined. Dimensions 3.3 x 3.3 m (10.7 x 10.7 ft).	Unit was cleaned and neutralized in 1986.	ER
126-B-1	184-B Power House Ash Pit, 188-B Ash Disposal Pit	1944-1969	Unknown amounts of coal ash were sluiced to this pit with raw river water. Dimensions: 85 x 76 m base footprint, 8 m below surface (280 x 250 ft, 25 ft).	Same as original, assumed 2 m (5 ft) fill.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 9 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
126-B-2	183-B Clearwells, Demolition and Inert Landfill	never used	Initially was part of the 183-B Water Treatment Facility. The site is made up of two clearwells separated in the center by a pump room. The pump room is the only portion of this unit currently containing waste. The waste consists of demolition waste from the above ground portion of the pump room. Dimensions: 229 x 41 m (751 x 135 ft).	Same as original.	ER
126-B-3	184-B Coal Pit, Demolition and Inert Landfill	1970's-current	Excavated pit originally used to store coal for use in the power house. Approximately 75% of the pit has been used for waste disposal and covered with .3 m (~1 ft) of pit run backfill material. Contains waste from demolished 100 B facilities; including released portions of 108-B, 117-B & C, 115-B/C, and 184-B. Dimensions: 122 x 69 m base footprint, 6 m below surface (400 x 225 ft, 21 ft).	In use, partially filled.	ER
126-B-4	B Area Brine and Salt Dilution Pits		The salt dissolving pit and brine pit were both below-grade concrete vaults with internal void spaces. salt pit: 14 m^3 (500 ft^3) brine pit: 25 m^3 (900 ft^3)	Removed (March 1988) Partially backfilled with rubble and leveled to grade with clean fill.	ER
128-B-1	100 B/C Burning Pit, 100-B Burn Pit	1943-1950	Received nonradioactive, combustible materials, such as paint waste, office waste, and chemical solvents. Area was believed to have been used for disposal of miscellaneous debris and soil that was excavated during construction of the retention basins and overflow trenches. Not known to have been used as a routine burning area. Dimensions: 30 x 30 m (100 x 100 ft) base footprint, 5 m (15 ft) deep with a 1:1 side slope.	Covered with 2 m (5 ft) of fill in 1978.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 10 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
128-B-2	100-B Burn Pit #2, Sand Blast Disposal Pit	1948-1968	Received nonradioactive, combustible materials. Old paint cans and sandblast sand can still be seen at the site. Office waste, paint waste, chemicals, and solvent were burned at this site. The site width ranges from 9 - 15 m (30 - 50 ft) and has a length of 137 m (450 ft) at the base. The depth is 8 m (25 ft) with a 1:1 side slope.	Partially buried.	ER
128-B-3	100-B Dump Site, Coal Ash and Demolition Waste Site	1944-1968	Coal ash, burning evidence and demolition rubble can be seen at the surface of the site. Dimensions: 137 x 18 m (450 x 60 ft) base footprint, 8 m (25 ft) deep with a 1:1 side slope.	Partially buried.	ER
128-C-1	100-C Burn Pit	unknown	Received combustible materials such as vegetation, office waste, paint waste, and chemical solvents, and some large metal material, such as hardware, machinery, and other noncontaminated miscellaneous equipment. Dimensions: 69 x 38 m (225 x 125 ft)	Partially buried.	ER
132-B-1	108-B Tritium Separations Facility, Aluminum Process Tube Examination Facility	1948-1954 1954-unknown	Originally built to provide laboratory support for the water treatment facilities and reactor operations. The building was later converted to a tritium recovery processing facility. After the tritium project was canceled, part of the building was used as an aluminum tube examination facility. Dimensions: 40 x 10 x 12 m (148 x 32 x 41 ft) with an additional 4 m (12 ft) below grade.	Demolished.	ER
132-B-2	116-B, B Reactor Exhaust Stack	1944-1968	Ventilation air from the B reactor. Dimensions: 5 m base diameter, 61 m long (16 x 100 ft).	Same as original.	D&D, 1998

Table 3-1 100 B/C Area Waste Sites and Facilities (page 11 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
132-B-3	108-B Ventilation Exhaust Stack	unknown	Ventilation stack for the 108-B Tritium Facility. A burial trench was excavated north of the stack. The dimensions are 91.4 x 9 x 5 m deep (300 x 30 x 18 ft). The stack was built of reinforced concrete. The maximum wall thickness was 1 m (2.5 ft) at the base. It rested on a double-octagon base which extended 3 m (10 ft) below grade. The upper octagon was 8 m (25 ft) across the flats and 1 m thick (3.25 ft). The lower octagon was 10 m (34 ft) across the flats and 2 m (7 ft) thick.	Demolished.	D&D, 1983 ER
132-B-4	117-B Filter Building, Exhaust Air Filter Building	1944-1968	Filtered ventilation air from the confinement zone of the 105-B reactor before its discharge to atmosphere through the stack. A reinforced concrete structure almost completely below grade. Consisted of two identical filter cells with operating gallery between. The dimensions were 18 x 12 x 11 m high (59 x 39 x 35 ft)	Demolished.	D&D, 1988 ER
132-B-5	115-BC Inert Gas Recirculation Facility	1952-1968	Houses gas circulating pumps and other equipment related to B and C reactor gas coolant system including a recirculation tunnel to B reactor and direct piping to C Reactor. Dimensions 51.2 x 25.9 m (168 x 85 ft). One story building with a reinforced concrete foundation and frame with exterior walls of concrete block. The roof is of reinforced concrete with built-up tar and gravel surface. Reinforced pipe tunnel connecting with reactor buildings.	Building demolished. Tunnels still in place.	D&D, 1989 ER
132-B-6	116-B-8, 1904-B2 Outfall Structure	1944-1968	Cooling water return to the Columbia River for B reactor. Consisted of an open concrete sump with associated effluent pipelines that ran from the sump to approximately mid-channel of the river. It also included a concrete spillway that terminated at the top of the river bank. Dimensions: 8 x 4 x 6 m deep (27 x 14 x 21 ft).	Demolished.	ER
132-C-1	116-C, 105-C Reactor Exhaust Stack	1952-1969	Ventilation stack for C reactor. Dimensions: 61 x 7.6 m (200 x 25 ft).	Buried in trench.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 12 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
132-C-2	116-C-4, 1904-C Outfall Structure	1952-1969	Cooling water return to the Columbia River for C reactor. Dimensions: 16 x 4 x 6 m (54 x 14 x 21 ft)	Demolished.	ER
132-C-3	117-C Filter Building	1961-1969	Identical with 117-B in purpose and description.	Demolished.	D&D, 1989 ER
151-B	Primary Substation	1944-present	Supplied all electrical power to 100 BC Area.	Same as original.	Active
181-B/181-C	River Pumphouse	1944-present	Pumps raw river water to water treatment plants or area reservoir. Services B and C reactors and provides export water to the 200 Area. Reinforced concrete and concrete block construction with slab roof and built-up felt, tar, and gravel surface. Dimensions: 75 x 15 x 6 m (245 x 50 x 20 ft).	Same as original. Underground diesel tank exists for emergency backup.	Active
182-B	Pumphouse and Reservoir	1944-present	Provides reserve water for raw export water for 100 and 200 Areas. The reservoir is of reinforced concrete and the pump house of reinforced concrete and concrete block. The latter building is below ground level. The reservoir dimensions are 132 x 94 x 6 m deep (432 x 309 x 18 ft) with a 95 million liter (25 million gal) capacity in two sections. The pump house dimensions are 114 x 12 x 7 m deep (373 x 38 x 22.5 ft).	Same as original.	Active
183-B	Filter Plant	1944-1968	Housed water treatment and filtering facilities and provided reservoir capacity for treated water. The filter plant consists of a head house and chemical building, flocculation and sedimentation basins, filter building and clearwell storage with pump room. The clearwell storage and pump room have been redesignated as 126-B-2, an inert landfill under the ER Program.	Demolished.	D&D, 1987
183-C	Filter Plant	1952-1969	Similar to 183-B except larger and supplies part of treated water to B reactor.	Partially demolished in 1988.	D&D, 2002

Table 3-1 100 B/C Area Waste Sites and Facilities (page 13 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
184-B	Powerhouse	1944-1968	Provided steam and emergency electric power. The building is of steel frame and concrete block construction. Roof is of precast concrete with built-up gravel surface. The furnace gas discharge is through two 300 ft stacks.	Demolished.	D&D, 1988
185-B	Water Treatment Plant	1944-present	Originally intended as a deaerating plant but never used for this purpose. Later housed a water laboratory, instrument shop, engineering test facility, and maintenance work and storage area. Dimensions: 94 x 15 x 18 m (307 x 48 x 60 ft).	Demolished.	D&D, 1993
187-B1 & B2	Emergency Storage Tanks	1944-1968	Stored "last-ditch" reactor cooling water. Two elevated 1,137,000 liters (300,000 gal) steel tanks.	Demolished.	
190-B	Main Pump House and Annex	1944-1968	Provided primary coolant water for B reactor. One-story reinforced concrete structure with concrete foundation, steel frame, concrete block superstructure and precast concrete roof covered with tar and gravel surfacing. The building is parallel and contiguous with the 185-B building with which it shares a common wall. The annex is structural steel corrugates asbestos, and cement construction with a roof of light weight aggregate concrete surfaced with built-up tar-gravel roofing. The main pumphouse dimensions are 152.5 x 61 x 9.2 m (500 x 200 x 30 ft). The annex dimensions are 61 x 24 m (200 x 80 ft).	Demolished.	D&D, 1993
190-C	Main Pump House	1952-1969	Similar to 190-B except smaller because storage tanks are not housed in the building.	Used for N Area storage.	100-N
1607-B1	124-B-1, 1607-B1 Sanitary Sewer System	1944-1960	Service to 1701-B badgehouse, 1709-B fire station, and 1720-B patrol change room and offices. Tank is 6.6 x 2.7 x 3.4 m (21.5 x 9 x 11 ft), and the drain field is 61 x 15.2 m (200 x 50 ft).	Same as original.	ER
1607-B2	124-B-2, 1607-B2 Sanitary Sewer System	1944-present	Service to 100 BC Area office buildings, 118-B-8 reactor building, and 190-B pumphouse. Tank is 10.8 x 4 x 4 m (35.5 x 13 x 13 ft), and the drain field is estimated to be 29.3 x 9.1 m (96 x 30 ft).	Same as original.	Active
1607-B3	124-B-3, 1607-B3 Sanitary Sewer System	1944-1974	Service to 184-B powerhouse. Tank 4.9 x 1.8 x 3.2 m (16 x 6 x 10.5 ft), and the drain field is 29.3 x 9.1 m (96 x 30 ft).	Same as original.	ER

Table 3-1 100 B/C Area Waste Sites and Facilities (page 14 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
1607-B4	124-B-6, 1607-B6, 1607-B4 Sanitary Sewer System	1944-present	Service to 151-B Primary Substation. Tank is 2.0 x .9 x 3.8 m (6.5 x 3 x 12.5 ft), and the drain field is estimated to be 29.3 x .7 m (96 x 2.3 ft).	Same as original.	Active
1607-B5	124-B-5, 1607-B4, 1607-B5 Sanitary Sewer System		Service to 181-B pumphouse. The tank is 1.2 x 1.2 x 3.8 m (4 x 4 x 12.5 ft) and the drain field is 3.4 x 2.1 m (11 x 7 ft).	Same as original.	ER
1607-B6	1607-B5, 1607-B6 Sanitary Sewer System	1944-present	Service to 182-B and 183-B. Tank is 2.4 x 1.2 x 3.8 m (8 x 4 x 12.5 ft), and the drain field is estimated to be 29.3 x 9.1 m (96 x 30 ft).	Same as original.	Active
1607-B7	124-B-7, 1607-B7 Sanitary Sewer System	1951-1969	Service to 183-B filter building. The tank is 2.0 x .9 x 3.8 m (6.5 x 3 x 12.5 ft) and the drain field is 29.3 x .7 m (96 x 2.3 ft)	Same as original.	ER
1607-B8	124-C-2, 1607-B8 Sanitary Sewer System	1951-1969	Service to 190-C pumphouse. Tank is 1.2 x 1.2 m (4 x 4 ft), and the drain field is 6.1 x 4.3 m (20 x 14 ft).	Same as original.	ER
1607-B9	124-C-3, 1607-B9 Sanitary Sewer System	unknown	Service to C reactor. Tank is 3.6 x 1.7 m (11.7 x 5.7 ft), and the drain field is 31.4 x 15.2 m (103 x 50 ft).	Same as original.	ER
1607-B10	1607-B10 Sanitary Sewer System	1952-1969	Service to 183-C headhouse. Tank is 1.2 x 1.2 m (4 x 4 ft), and the drain field is 6.1 x 4.3 m (20 x 14 ft).	Same as original	ER
1607-B11	1607-B11 Sanitary Sewer System	1952-1969	Service to 183-C filter building. Tank is 1.2 x 1.2 m (4 x 4 ft), and the drain field is 7.6 x .8 m (25 x 2.7 ft).	Same as original	ER
1701-B	Gate House,	1944-unknown	Served as area badge house and patrol headquarters. A two-story frame structure, concrete foundation and first floor, wood second floor, shake siding, and flat tar-gravel surfaced roof. Dimensions: 12 x 7 x 7 m high (41 x 22 x 23 ft).	Demolished.	D&D
1701-BA	Exclusion area badge house	1944-unknown	One story concrete block structure on concrete floor and foundation. Gable wooden roof. Dimensions 6.1 x 6.1 x 3.7 m (20 x 20 x 12 ft).		D&D, 2009
1702-B	Badge House	1944-unknown	Served as the B Reactor area badge house and provided entrance into the exclusion area. A one-story wooden frame structure on a concrete floor and foundation. Asbestos shake siding, gable wooden roof covered with roll-roofing. Dimensions: 6 x 6 x 4 m high (20 x 20 x 12 ft).	Demolished.	

Table 3-1 100 B/C Area Waste Sites and Facilities (page 15 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
1702-C	Badge House	1952-unknown	Similar to 1702-B except about half the size.	Same as original	D&D, 2002
1703-B	Technical Office Building	unknown	Provided office space for staff involved with 108-B activities. Dimensions unknown.	Demolished.	
1704-B	Office Building	1944-1968	Provided offices for area administrative and technical personnel. A one-story "T" shaped wooden frame structure built on concrete block foundation or concrete footing. Wooden floor, asbestos shake siding, and gable and hipped roof covered with composition shingles. Dimensions: 45 x 35 x 8 m high (147 x 116 x 26 ft).	Demolished.	
1707-B	Change House		Originally used as a change house and evolved into an office facility. A one-story frame structure on a concrete foundation with concrete floor, asbestos shake siding, and flat wooden roof with built-up tar and gravel surfacing. Dimensions: 9 x 20 x 5 m high (30 x 66.5 x 16 ft).		
1707-A-B	Maintenance Change House	1944-1968	Provided locker, shower facilities, and lunchroom. A one-story frame structure on a concrete foundation with concrete floor, asbestos shake siding, and flat wooden roof with built-up tar and gravel surfacing. Dimensions: 9 x 20 x 5 m high (30 x 66.5 x 16 ft)	Demolished.	
1709-B	Fire Headquarters	1944-1968	Originally used as the fire headquarters and later as office space. Single story frame structure on a concrete foundation, concrete floor, asbestos shake siding, flat wooden roof with built-up tar and gravel surfacing. Dimensions: 15 x 12 x 4 m high (48 x 40 x 12 ft).		

Table 3-1 100 B/C Area Waste Sites and Facilities (page 16 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
1713-B	Store Room and Warehouse	1944-1968	Originally used as a store room and warehouse (contents unknown) and later as technical office and laboratory space. Single story frame structureton concrete foundation with concrete floor, asbestos shake siding, and flat wooden roof with built-up tar and gravel surfacing. Laboratories are outfitted for instrument testing and calibration. Dimensions: 23 x 16 x 5 m (77 x 54 x 16.5 ft).		
1713-C	Storage Building	unknown	Suspected solvent storage.		
1714-C	Solvent Storage Building	unknown	Transite building used to store solvents		D&D, 2002
1715-B	Oil and Paint Storage Building	1944-1968	Used for storage of oil and paint. Single story frame structure on concrete foundation with concrete floor, asbestos shake siding, and flat wood roof with built-up tar and gravel surfacing. Dimensions: 13 x 4 x 5 m high (42 x 14 x 18 ft).	Demolished.	
1716-B	Automotive Repair Garage	1944-1968	Provided garage and office facilities. Single-story frame structure on concrete foundation with concrete floor, asbestos shake siding, and flat wooden roof with built-up tar and gravel roof. The building is equipped for service station function and light maintenance. Dimensions: 16 x 12 x 5 m high (53.5 x 40 x 18 ft)	Demolished. Underground gasoline tank removed 12/92.	
1717-B	Area Maintenance Shops	1944-1968	Houses carpenter, millwright, welding, and painting shops which provide maintenance service for production operations and area facilities. A single-story wooden frame structure with asbestos siding, concrete foundation and floor, and flat wooden roof with built-up tar and gravel surface. Dimensions: 46 x 24 x 8 m high (150 x 80 x 25 ft).	Demolished	

Table 3-1 100 B/C Area Waste Sites and Facilities (page 17 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
1719-B	First-Aid Station	1944-1968	Provided first aid facilities for area. Single-story frame structure on concrete foundation with concrete floor, asbestos shake siding, and wooden gable roof with composition shingles. This facility contains a first aid room, examination room, laboratory, ward, office, and sanitary facilities. Dimensions: 10 x 8 x 6 m (32 x 22.5 x 19.5 ft).	Demolished.	
1720-B	Patrol Headquarters	1944-1968	Originally used as patrol headquarters and later served as office facility. Single-story frame structure on concrete foundation with concrete floor, asbestos shake siding, and flat wooden roof with built-up tar and gravel surface. Dimensions: 24 x 10 x 5 m high (79 x 32 x 15 ft).	Demolished.	
1722-B	Paint Shop and Riggers Loft	1944-1968	Single-story frame structure on concrete foundation with concrete floor, asbestos shake siding, and flat wooden roof with built-up felt and gravel surface. Dimensions: 12 x 9 x 5 m high (40 x 30 x 15 ft).	Demolished.	
1734-B	Gas Cylinder Storage Building	1944-1968	Stored gas cylinders. Dimensions unknown.	Demolished.	
1736-B	Storage Building	unknown	Stored maintenance tools and equipment. Sheet metal Butler building with plywood floor with a 6 x 12 m (20 x 40 ft) footprint.	Demolished.	
1736-C	Storage Building	1952-unknown	Stored maintenance tools and equipment. Sheet metal Butler building.		
1901-B	Soft Water Tank	1944-unknown	Stored soft water for powerhouse. Elevated Steel water tank.	Demolished.	
1902-B	Sanitary Water Tank	1944-unknown	Stored sanitary water for plant. Elevated 379,000 liter (100,000 gal) steel water tank.	Demolished.	
none	100 B/C Riverlines	1944-1969		Same as original.	D&D, 1994

Table 3-1 100 B/C Area Waste Sites and Facilities (page 18 of 18)

Site Number	Site Name/Alias	Yrs in Service	Original Purpose and Description	Current Physical Description	Program Information
none	105-B Water Tunnels	1944-1968			D&D, 1999
none	105-C Water Tunnels	1952-1969			D&D, 1999
Pipeline	Effluent lines from the 105's to 107's and 107 to outfalls	1944-1969	Carried reactor process effluent water.	Same as original.	ER
600-33	105-C reactor test loop burial site	before 1963	Schedule 160 stainless steel tubing. Was inserted into the south side of the C reactor core and was used to test the effects of ionization on various chemicals being considered for reactor process tube scaling and cleaning. The loop had been left in place for many weeks and was highly irradiated. It was removed and buried at a site 300-400 ft south of the 105-C reactor building.	Same as original.	ER
600-34	100-Bailed tumbleweed disposal site	unknown	Bailed tumbleweeds were disposed of to this site	Same as original.	ER

Table 3-2 Site Location Confidence Designation (page 1 of 3)

WASTE SITE NUMBER	WASTE SITE NAME	LOCATION CONFIDENCE DESIGNATION	COMMENTS
116-B-4	105-B Dummy Decon French Drain	Very Confident	Surface structure - stand pipe
116-B-7	1904-B1 Outfall Structure	Very Confident	Surface structure - existing site
116-B-12	117-B Crib	Very Confident	Surface structure - steel vent with cap
116-B-16	111-B Fuel Examination Tank	Very Confident	Surface structure - concrete floor
116-C-2A	105-C Pluto Crib	Very Confident	Surface structure - well casing through crib, installed as part of crib
116-C-2B	105-C Pluto Crib Pump Station	Very Confident	Surface structure - concrete structure with steel lid
116-C-2C	105-C Pluto Crib Sand Filter	Very Confident	Surface structure - concrete lid
116-C-3	105-C Chemical Waste Tanks	Very Confident	Surface structure - vent pipes
116-C-5	107-C Retention Basin	Very Confident	Surface structure - steel basin
118-B-6	108-B Solid Waste Burial Ground	Very Confident	Surface structure - concrete pad with lids
118-C-4	105-C Horizontal Control Rod Storage Cave	Very Confident	Surface structure - existing site
126-B-2	183-B Clearwells	Very Confident	Surface structure - existing site
126-B-3	184-B Coal Pit	Very Confident	Surface structure - existing site
600-34	100-B Bailed Tumbleweed Disposal Site	Very Confident	Surface structure - existing site
116-B-1	107-B Liquid Waste Disposal Trench	Confident	Photos and drawings available
116-B-2	105-B Fuel Storage Basin Trench	Confident	Mound on site
116-B-3	105-B Pluto Crib	Confident	Drilled during LFI, site marker buried under gravel
116-B-5	108-B Crib	Confident	Drawings available, visible pipe on site
116-B-6A	111-B Crib #1	Confident	ISV project site, gravel backfill
116-B-6B	111-B Crib #2	Confident	Documents available.
116-B-10	108-B Dry Well/Quench Tank	Confident	Drawings available.
116-B-11	107-B Retention Basin	Confident	Photos and drawings available, depression on site
116-B-14	107-B North Sludge Trench	Confident	Within shadow of contamination of retention basin, concrete marker and mound on site
116-B-15	105-B Fuel Storage Basin Cleanout Percolation Pit	Confident	Photos available, mound on site
116-C-1	107-C Liquid Waste Disposal Trench	Confident	Photos and drawings available, depression and soil change on site

Table 3-2 Site Location Confidence Designation (page 2 of 3)

WASTE SITE NUMBER	WASTE SITE NAME	LOCATION CONFIDENCE DESIGNATION	COMMENTS
116-C-6	105-C Fuel Storage Basin Percolation Pit	Confident	Photos available, depression with mounded dredged material
118-B-1	105-B Burial Ground	Confident	Photos and drawings available, markers on site
118-B-10	Solid Waste Pit	Confident	Mound and chains on site
118-C-1	105-C Burial Ground	Confident	Photos and drawings available, markers on-site
118-C-2	105-C Ball Storage Tank	Confident	Mound on site, additional site walk may be beneficial
126-B-1	184-B Power House Ash Pit	Confident	Photos and drawings available, ash visible on surface
126-B-4	B Area Brine and Salt Dilution Pits	Confident	Drawings available
128-B-3	100-B Dump Site	Confident	Photos available, boulders and mound on site
132-B-1	108-B Tritium Separations Facility	Confident	D&D records available
132-B-3	108-B Ventilation Exhaust Stack	Confident	D&D records available
132-B-4	117-B Filter Building	Confident	D&D records available
132-B-5	115-BC Inert Gas Recirculation Building	Confident	D&D records available
132-B-6	116-B-8, 1904-B2 Outfall Structure	Confident	D&D records available
132-C-1	116-C, 105-C Reactor Exhaust Stack	Confident	D&D records available
132-C-2	116-C-4, 1904-C Outfall Structure	Confident	D&D records available
132-C-3	117-C Filter Building	Confident	D&D records available
	Effluent Pipelines	Confident	Photos and drawings available
116-B-9	104-B-2 French Drain	Not Confident	
116-B-13	107-B South Sludge Trench	Not Confident	Within shadow of contamination of retention basin
118-B-2	Construction Burial Ground #1	Not Confident	
118-B-3	Construction Burial Ground #2	Not Confident	
118-B-4	105-B Spacer Burial Ground	Not Confident	
118-B-5	Ball 3X Burial Ground	Not Confident	Additional site walk recommended
118-B-7	111-B Solid Waste Burial Ground	Not Confident	
120-B-1	105-B Battery Acid Sump	Not Confident	
128-B-1	100-B/C Burning Pit	Not Confident	
128-B-2	100-B Burn Pit #2	Not Confident	
128-C-1	100-C Burn Pit	Not Confident	

Table 3-2 Site Location Confidence Designation (page 3 of 3)

WASTE SITE NUMBER	WASTE SITE NAME	LOCATION CONFIDENCE DESIGNATION	COMMENTS
1607-B1	124-B-1, 1607-B1 Sanitary Sewer System	Not Confident	Additional site walk recommended to search for surface indicators
1607-B3	124-B-3, 1607-B3 Sanitary Sewer System	Not Confident	Additional site walk recommended
1607-B5	124-B-5, 1607-B4, 1607-B5 Sanitary Sewer System	Not Confident	Additional site walk recommended
1607-B7	124-B-7, 1607-B7 Sanitary Sewer System	Not Confident	Additional site walk recommended
1607-B8	124-C-2, 1607-B8 Sanitary Sewer System	Not Confident	Additional site walk recommended
1607-B9	124-C-3, 1607-B9 Sanitary Sewer System	Not Confident	Additional site walk recommended
1607-B10	1607-B10 Sanitary Sewer System	Not Confident	Additional site walk recommended
1607-B11	1607-B11 Sanitary Sewer System	Not Confident	Additional site walk recommended
600-33	105-C Reactor Test Loop Burial Site	Not Confident	

Table 3-3 Mean High Water Levels, 1980 - 1991

WATER YEAR	WATER FLOW BY MONTH - CFS (1)											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1980	115,000	153,000	134,000	150,000	139,000	112,000	124,000	160,000	208,000	141,000	122,000	94,000
1981	89,300	118,000	184,000	168,000	166,000	120,000	129,000	238,000	281,000	253,000	189,000	123,000
1982	115,000	110,000	127,000	157,000	189,000	221,000	199,000	211,000	246,000	243,000	196,000	121,000
1983	106,000	124,000	118,000	140,000	196,000	240,000	198,000	217,000	200,000	190,000	182,000	134,000
1984	93,400	137,000	162,000	167,000	162,000	170,000	174,000	169,000	207,000	174,000	125,000	97,900
1985	98,600	112,000	138,000	174,000	179,000	135,000	140,000	163,000	143,000	122,000	91,100	103,000
1986	115,000	170,000	157,000	109,000	137,000	190,000	197,000	157,000	176,000	153,000	131,000	120,000
1987	104,000	113,000	139,000	164,000	133,000	130,000	139,000	185,000	177,000	111,000	104,000	105,000
1988	133,000	111,000	139,000	147,000	145,000	112,000	104,000	161,000	153,000	120,000	111,000	120,000
1989	114,000	127,000	157,000	179,000	171,000	139,000	162,000	193,000	174,000	105,000	81,100	103,000
1990	111,000	130,000	132,000	152,000	183,000	179,000	186,000	185,000	275,000	211,000	138,000	101,000
1991	99,400	176,000	197,000	185,000	175,000	189,000	193,000	231,000	237,000	ND	ND	ND
MEAN	107,808	131,750	148,667	157,667	164,583	161,417	162,083	189,167	206,417	165,727	133,655	111,082
WATER LEVEL (2)	392' 119.5m	394' 120.1m	395' 120.4m	396' 120.7m	397' 121.0m	396' 120.7m	396' 120.7m	398' 121.3m	399' 121.6m	397' 121.0m	394' 120.1m	393' 119.8m

Notes:
1) Supplied by the U.S. Geologic Survey, Water Resources Division, Tacoma, Washington.
2) U.S. Department of the Army, 1992

Table 3-4 Threatened, Endangered, and Sensitive Plant Species Specific to 100 B/C Area

Species	Area	Listing
Rorippa columbiae	Columbia River shoreline	State Endangered Federal Candidate
Limosella acaulis	shallow water or wet mud along the Columbia River	State Sensitive
Lindernia anagallidea - False Pimpernel	Columbia River shoreline west of 100 B/C	State Sensitive
Carex densa - Dense Sedge	Columbia River shoreline	State Sensitive
Cyperus rivularis - Shining Flatsedge	Columbia River shoreline	State Sensitive

Table 3-5. Federal and State Threatened and Endangered Wildlife Species

Species		Federal		State	
Common Name	**Scientific Name**	**E[1]**	**T[2]**	**E[1]**	**T[2]**
peregrine falcon	Falco peregrinus	x		x	
bald eagle	Haliaeetus leucocephalus		x		x
Aleutian Canada goose	Branta canadensis leucopareia		x	x	
American white pelican	Pelecanus erythrorhynchos			x	
sandhill crane	Grus canadensis			x	
pygmy rabbit	Brachylagus idahoensis				x
ferruginous hawk	Buteo regalis				x

1: Endangered
2: Threatened

Source: Landeen et al. 1993

4.0 EXCAVATION APPROACH

This section develops the approach to be used for excavation and demolition of the 100 B/C waste sites. Specific elements addressed are:

- remediation requirements
- 100 B/C remediation methodologies
- excavation volumes, rates, and durations
- coordination with other programs
- excavation plan
- site interferences
- excavation sequencing.

Site closure, reclamation and project closeout are discussed in Section 5.0.

4.1 EXTENT OF CONTAMINATION

The 100 B/C remedial design requires estimation of the volume and depth of contaminated material to be removed. These estimates provide the basis for development of excavation methodologies, throughput, and interactions between adjacent sites and other facilities.

The estimates for contaminated and excavated volumes are presented in Attachment 1 (Volume 2). A summary of the contaminated volume estimate is presented in Table 4-1. The estimate includes minimum, maximum, and probable volumes by type of waste (soil, metal, concrete, and solid waste [i.e., non-metal compactible material]), and the minimum, probable, and maximum depth of contamination. The estimates are divided in this way to show the potential variability of the volumes with respect to the assumptions. The system is designed for the probable case, with contingencies for handling the maximum. The minimum case is presented as a lower bound to the volume estimate. The probable volume is the most likely volume, based on available sampling data and operations records. The maximum volume is the largest reasonable volume. For liquid waste sites the difference between the probable and maximum volumes is directly related to the difference between expected depth of contamination and groundwater.

Several waste sites listed in Table 4-1 are shown to have probable contaminated volumes of zero. These sites are indicated on Drawing H-1-80211 as being left in place (not excavated).

The volume estimates are based on the following general assumptions (additional site specific assumptions are given in Attachment 1 (Volume 2):

Burial Grounds

- Burial grounds did not leach contamination into the surrounding soil.

  Basis: Dorian and Richards (1978) sampling results.

- In the absence of data, construction burial ground depth is 20 ft.

  Basis: Typical depth of burial trenches listed in WIDS (DOE-RL 1988).

- In the absence of data, burial ground trenches are 20 ft wide at the bottom, 20 ft deep, and have 1:1 side slopes.

  Basis: Typical depth and spacing of trenches; approximate slope from 100 Area limited field investigations (LFI) work on liquid waste sites.

- Burial grounds are covered with 5 ft of clean soil.

  Basis: Approximate height of fill based on field observations of 118-B-1 and interviews.

- In the absence of data, burial ground waste is comprised of 75% non-metal compactible waste and 25% metal waste by volume.

  Basis: Miller and Whalen (1987)

- Burial grounds were filled completely.

  Basis: Miller and Whalen (1987) and historical photographs.

Liquid Waste Sites

- Cesium and strontium traveled further than any other radioactive contaminant. Tritium, uranium, and technetium-99 probably traveled as far as cesium and strontium, but because they have a low affinity for soil, they are not expected to be present in the soil column.

  Basis: Conversations with chemists and radiation monitoring specialists.

- In the absence of data, trenches were built with 1:1 side slopes.

  Basis: Approximate slope from 100 Area LFI work.

- If the average water flux into a liquid waste site is less than the soil's ability to drain (unsaturated vertical hydraulic conductivity), then the liquid went straight down without lateral dispersion. The unsaturated vertical hydraulic conductivity for Hanford formation material is about 8.0 E-4 cm/sec.

Basis: Professional judgement.

- The saturated vertical hydraulic conductivity is one order of magnitude greater than the unsaturated vertical hydraulic conductivity (i.e., about 8.0 E-3 cm/sec).

  Basis: Professional judgement.

- The horizontal hydraulic conductivity is one order of magnitude less than the unsaturated vertical hydraulic conductivity (i.e., about 8.0 E-5 cm/sec).

  Basis: Professional judgement.

- In the absence of data, contamination extends no more than 5 ft below the bottom of a liquid waste site, or a site with expected liquid migration.

  Basis: Review of Dorian and Richards (1978) and LFI data.

- In normal operations (for the probable case), trenches were maintained with at least 1/3 freeboard and this 1/3 is not contaminated. In the worst case (maximum case), the trenches were filled to the top.

  Basis: Professional judgement.

- In the absence of data, the top of cribs are 6 ft below grade.

  Basis: Information for 116-B-6A from the in situ vitrification testing of this crib.

- The worst (maximum) case for liquid waste site contamination is that contamination extends to groundwater.

  Basis: Maximum depth possible (for contaminated vadose material).

- Contamination from pipe leaks is laterally symmetric.

  Basis: Professional judgement.

- Process effluent pipe leaks contaminated 10% of their total length (probable case).

  Basis: Professional judgement; leaks are likely to have occurred at junction boxes or joints, but not every joint is likely to have leaked.

- Process effluent pipes are placed in a bed of gravel with 3 in of gravel below, 6 in of gravel above and 2 ft of gravel on either side of the pipe.

  Basis: Typical construction method.

- All fill within the retention basins is contaminated.

  Basis: Professional judgement.

Tile Field

- In the absence of data, the width of tile field trench laterals is the diameter of the pipe plus two feet.

  Basis: Professional judgement.

- Contamination starts at the top of pipes in tile fields.

  Basis: Professional judgement.

- In the absence of data, septic tanks of the same volume have the same dimensions.

  Basis: Professional judgement.

4.2 100 B/C REMEDIATION METHODOLOGIES

This section describes strategies and methodologies for excavation/demolition, transport, and treatment of 100 B/C wastes. Although the analytical system development is being performed as a separate project, the key concepts are described in this report for clarity because of the close interrelationships between the materials handling and analytical activities.

4.2.1 Excavation Strategy

The 100 B/C excavation strategy is influenced by the following considerations:

- operational parameters for the equipment selected for excavation, demolition and transportation of materials
- the methods employed for removal, monitoring, transport and processing of the excavated materials
- design requirements for the excavation, access routes, spoil stockpiles and final topography.

Excavation methodologies and strategies, discussed in the following subsections, are divided into three general areas: soil excavation, buried waste excavation, and demolition of excavated debris. Design strategies are discussed as they relate to the excavation and reclamation plans.

4.2.1.1 Soil Excavation. As indicated in Table 4-1, approximately 74% of the contaminated media in the 100 B/C Area is soil totaling in the millions of cubic yards. When overburden is considered, the volumes to be removed within the specified time frame are substantial and will require a continuous production-oriented approach. That is, the excavation must be accomplished with high throughput equipment maintaining continuous operation to the maximum extent possible.

While the pre-design guidance (WHC 1993a) did not specify the types of excavation equipment, criteria were established to guide the selection (see Sections 2.0 and 3.4.1 of the referenced document). The previous conceptual design studies (WHC 1991b) performed an evaluation of several equipment alternatives such as dragline, clamshell, excavator (backhoe), and loader. In that evaluation, selection criteria were established which included considerations such as rate, depth, excavation control, and maneuverability. The results of the conceptual study indicated that the wheeled loader best fits the evaluation criteria for open excavations involving only soil, and backhoes are best suited for applications requiring maneuverability such as around pipelines or other buried structures. Based on the previous study and upon further analysis of site conditions and project requirements, the following criteria are considered to be key in the selection of excavation equipment:

- high excavation rate
- capable of excavating to the water table
- capable of handling large boulders (12 in and larger)
- efficient loading of bulk containers
- maneuverable in small sites
- do not generate excessive quantities of fugitive dust
- maneuverable around obstructions (such as pipelines and buried structures)
- provide good excavation control (to differentiate between clean and contaminated)
- compatible with the anticipated mode of in situ monitoring (analytical).

Consistent with the previous conceptual studies, the equipment systems which are currently judged to best fit all of these criteria are the backhoe and the front end loader. The backhoe is particularly maneuverable in small sites and around buried objects. The loader when used in combination with a dozer provides rapid excavation and good depth control especially when excavating in shallow lifts (required for in situ monitoring, see Section 4.2.3).

The development of excavation strategies for the major site groups follows the approach described below:

- The 116-B-12 crib is evaluated as representative of a small waste site; the 116-B-1 trench is evaluated as representative of a typical medium-size site; the 116-B-11 retention basin is evaluated as representative of a large soil waste excavation (after removal of the basin).
- Backhoe excavation is compared against excavation using the dozer/loader combination.
- Excavation in shallow lifts (1 to 2 ft) is compared against side-to-side excavation in full vertical cuts from the surface. In both cases, the comparison evaluates excavation in all dimensions.
- Excavation in shallow lifts using in situ monitoring is compared against excavation from the surface using ex situ monitoring of excavated soils.
- Large-capacity buckets (10-13 cubic yards) are compared to medium-capacity buckets (6-7 cubic yards).
- Minimal in situ monitoring (a vertical-face excavation case) is compared to comprehensive in situ surface monitoring (shallow lift case).
- Waste minimization (maximum differentiation between clean and contaminated soil) is compared to a case where waste minimization is not a goal (more clean soil is sacrificed as contaminated to increase productivity).

Key assumptions made for each of these comparative situations include:

- Side slopes are excavated to 1.5/1 for safe operation within the excavation and for stable side slopes.
- In situ monitoring consists of surface radiation measurements which are only capable of measuring radionuclide concentrations to a depth of 10 in (see Section 4.2.3).
- All excavated soils are transferred directly from the backhoe or loader bucket to a bulk container carried by a truck.
- Measures to control fugitive dust and the spread of airborne contamination will be implemented and the measures are assumed effective. It is also assumed that the alternative methods of excavation provide the same degree of contamination control.

These evaluations produce the following results:

- Waste minimization is a strong cost influence, i.e. disposal costs strongly outweigh excavation costs. Some loss in production rate can be sacrificed to save clean material which would otherwise be disposed as contaminated.
- To achieve waste minimization, excavation in shallow 1 to 2 ft lifts using in situ surface monitoring for excavation control is the preferred approach.
- Excavator bucket size is determined primarily by the size of the shipping container; a 6-7 cubic yard bucket size is nearly optimum for both the backhoe and loader, even though the use of these medium-sized buckets slightly reduces production rate as compared to using the large buckets.
- Backhoe and dozer/loader excavation are nearly equal in rate for most applications; the backhoe has the advantage in small sites, near the bottom of larger excavations, or in the fringes (boundary between clean and contaminated); the dozer/loader is preferred in larger area excavations which are not near the fringes, such as in overburden stripping or in the center of the contaminated plume.
- Excavation in shallow lifts using in situ monitoring is preferred for medium- and large-size sites; excavation from the surface using ex situ monitoring is preferred for small sites.

In most cases, in situ surface monitoring should be adequate to identify clean and contaminated materials and guide excavation operations. All excavated materials are transported in containers to their respective destinations (see Section 4.2.2) depending upon the results of the in situ monitoring. However, as a backup to in situ monitoring, containerized soils are further monitored ex situ to verify designation of the soil as clean or contaminated and to verify waste class. Containers are monitored only when excavating in the transition zones between waste classes or between areas of clean soil and contaminated soil. This procedure is discussed in more detail in Section 4.2.3.

Water sprays and control agents are used to reduce fugitive dust in all excavation and demolition operations. Sprays are applied within the excavation at excavation points and upon traveled surfaces. Sprays are also provided at container filling points. Further descriptions of dust control systems are provided in Section 6.5.

4.2.1.2 Buried Waste Excavation. Overburden removal from burial grounds proceeds in the same manner as a soil excavation site (Section 4.2.1.1). Once the trenches are uncovered, the excavation proceeds from the surface excavating solid waste, soil admixed with the solid waste, and soil between trenches. Both visual and in situ monitoring techniques are used to differentiate buried solid waste and clean vs contaminated soil. Backhoes and loaders are appropriate for soils and some solid wastes, while excavators, with grapple attachments, are more versatile for removing solid waste of odd shapes or sizes, such as control rods. Size reduction, such as cutting control rods into container-lengths, is performed as a separate operation with shear attachments on separate machines to avoid delaying excavation operations.

Any materials unearthed which require further processing, such as intact drums of unknown content or compressed gas cylinders, are visually identified during the excavation and are removed to a staging area for further processing. Storage of these materials is discussed in Section 4.2.4.

4.2.1.3 Demolition. Major demolition activities include razing concrete structures, steel tanks, and buried pipelines. Demolition activities are generally separate from the excavation activities and use different types of equipment. The standard machine for demolition is a hydraulic excavator base equipped with interchangeable attachments for cracking and pulverizing concrete, cutting steel, grappling large pieces, and densifying metal shapes. Operations for each of the major site-types are described in the subsections below.

Concrete Structures. Thick concrete structures (>2 ft thick) such as the walls of the 116-B-11 retention basin are demolished by first breaking the concrete using a hydraulic hammer attachment. Once reduced to smaller pieces, the concrete chunks are sized for the containers using the pulverizer attachment. It is not necessary to separate the rebar from the concrete, although some will separate during pulverization; separated rebar can be cut using the shear attachment, although the pulverizer attachment is also capable of cutting rebar albeit less efficiently.

Thinner concrete walls (<2 ft thick) and concrete pipelines are demolished with either the cracking or shear attachments and do not require the hydraulic hammer. The hydraulic hammer is slower to use and should only be used in situations where concrete is too thick to use the cracking attachment, i.e., does not fit within the jaw opening. Loading of the demolition debris is performed using loaders or grapples; the choice depends upon the sizes and shapes of the debris.

Steel Structures. Steel structures such as the 116-C-5 retention basins are demolished using the mobile shear attachment. Plate is cut to fit the waste container; if necessary, a densifier attachment is used to flatten bent plate into more compact shapes to save space in the disposal facility. A grapple is used to load sized plate sections into a container.

Buried Pipelines. The major pipelines are uncovered with backhoes and/or the dozer/loader combination to remove overburden. The pipe is first crimped with a grapple or densifier attachment, the crimped section is cut using mobile shears, and the cut pipe section is removed to a staging area near the excavation. Staged pipe sections are then compacted (flattened) using the densifier, or a transportable compactor. Compacted pipe sections (sized to fit the shipping containers) are then grappled into shipping containers.

4.2.1.4 Excavation Design Strategy. Design of the waste site excavations, excavation access routes, and excavation spoil distribution is dependent upon the constraints imposed by existing site conditions and the methods chosen to perform the tasks.

The waste site excavations are designed with the following considerations:

- The excavation geometry is controlled by the locations and dimensions (length, width and depth) of the waste sites, the excavation design slopes (1.5H:1.0V), and by access requirements. Waste site boundaries are discussed in Section 4.3 and Attachment 2 (Volume 2).

- The bottom elevation of the excavation along the B and C Reactor effluent pipelines is based on invert elevations derived from construction drawings.

- Personnel egress from the excavation does not require alteration of the design slope angles or the placement of any special points of access.

- The excavation is designed to minimize the removed material volume based on the estimated probable extent of contamination at each waste site (see Section 4.3).

- Sites which are very close to each other are incorporated into one excavation.

- The excavation is designed to not encroach within 5 ft (2 m) of the B or C Reactor Buildings.

- The preliminary excavation design does not consider the presence of underground or aboveground interferences such as utilities. However, the location of critical interferences such as the active water lines and groundwater monitoring wells will need to be accurately pinpointed during final design and additional excavation required to remove and/or replace such utilities will be considered at that time.

- Due to the low susceptibility of the site to flooding or ponding of precipitation, a surface water diversion system is not incorporated.

Excavation access is provided through a network of haul roads, site access roads, and ramps to the bottom of waste site excavations. The following considerations are made in the design of access:

- The number and width of excavation ramps are kept to a minimum.

- Ramps are provided to the bottom of most excavations to allow access by haul trucks in the larger sites and access by all-terrain vehicle in smaller sites.

- Ramps for larger excavations are 12 m wide and extend to the bottom of the excavation at a 10% grade. This design allows for truck travel on the ramp.

- Ramps for smaller excavations are 6 m wide and extend to the bottom or near the bottom of excavations at a 20% grade. These steeper ramps are provided only if the size of the site makes it impractical for trucks to travel into the excavation.

- Minimum allowable truck turning radius is 15 m.

- Ramps are placed down-grade where possible to minimize the amount of excavated material.

- Ramps and haul roads are generally oriented from the excavations to the east to reduce hauling distances.

- The existing road system is utilized as much as possible to reduce the cost of road improvements and to avoid disturbing more land than necessary.

- For the placement of ramps, interferences such as above- or below-ground utilities are avoided where possible.

- Separate ramps are planned for many sites which are close to one another to provide some flexibility in scheduling the sequence of the excavation. In some instances, however, consideration is given to the use of prior excavations as ramps or providing only one ramp to a group of sites which are likely to be excavated simultaneously.

Clean spoil to be reused for site reclamation is stockpiled in two ways:

- Overburden and ramp soil (always assumed to be clean) along with other material determined to be clean upon excavation is stockpiled locally. The total quantity of locally stockpiled fill is estimated to be about 1.4 million loose cubic yards (LCY).

- Suspected contaminated material and material from the fringe of the contaminated zone is transported to the classification structure. Material classified as clean (estimated at 0.1 million LCY) is stockpiled near the classification structure in the central stockpile. All other material is transported to the disposal facility (about 2.0 million LCY).

Stockpile areas are designed to efficiently use available space. The local stockpile areas are laid out as follows:

- Material is placed as close to the excavation access points (ramps) as possible allowing some room for excavation expansion.

- Piles are oriented parallel to the long access of each excavation to facilitate replacement.

- The geometric design of the piles is not specified; a uniform pile thickness (to a maximum of 4 m with a 2H:1V angle of repose) is assumed to evaluate the amount of area needed for each portion of the excavation. The stockpiles will probably be constructed by a combination of truck off loading and dozer/loader pushing to form a high bank or series of high banks within the designated areas.

- The use of previously excavated waste sites as locations for the placement of soil spoil from an active portion of the excavation avoids the double handling of material. A plan for such placement cannot be developed at this time due to the uncertainties in the timing of closure.

The central stockpile area is sized to allow the placement of approximately 780,000 LCY or about six times the quantity required. This capacity allows up to 50% of all clean excavated material to be placed in the central stockpile area which provides for backup storage should any local stockpiles not be feasible.

4.2.2 Transport

Transport Mode. A previous study and cost analysis was performed by WHC to evaluate different modes of waste transport (WHC 1991f). The study evaluated rail and off-road trucking in addition to aerial tram, on-road trucking, overland conveyors, and slurry transport. Evaluation factors included as low as reasonably achievable (ALARA), safety, environmental risk, sensitivity to operations and site extremes (i.e., seismicity, weather, traffic and topography), and cost. Slurry transport scored the highest in that study. However, slurry transport is rejected in the current design because it does not meet the pre-design guidance criteria of minimum secondary waste generation and maximum use of existing transportation infrastructure. It is also concluded that slurry transport is not a practical method of handling the wide range of waste materials to be transported, especially boulders, concrete, and steel waste forms.

The previous study showed that rail and off-road truck transport were both viable options, scoring near the top among all competing options. Between the two, rail transport was judged preferable, primarily because of greater safety and lower cost.

A more recent cost analysis was performed by WHC (WHC 1993b) to directly compare the off-road truck and rail options. The results showed rail to be significantly less costly, primarily because of the available rail infrastructure contrasting with the high cost of trucks and the need to construct special haul roads. This finding is consistent with general practice in the shipping industry and is consistent with a similar project now being conducted in the Uranium Mill Tailings Remedial Action (UMTRA) program in Grand Junction, Colorado. The current design effort accepts the results of these previous studies as valid without further analysis. The pre-design guidance (WHC 1993a) also specifies rail transport. Material will be transported from the excavations to a rail loading facility via highway trucks over a road network, the majority of which is existing. The existing road network will be improved for use as haul roads and supplemented with new roads to complete the routes.

Transport Containers. The conceptual design studies (WHC 1991b) proposed the use of 50 cubic yard rectangular steel boxes for use as shipping containers. In a subsequent analysis (WHC 1993c), WHC recommended the use of similar containers but of a smaller size (35 cubic yard reusable containers for low activity wastes and 18 cubic yard single use containers for high activity). Specification of the 35 cubic yard container, which WHC estimated to weigh about 50 tons fully loaded, is based upon projected practical weight limits of trucks and container handlers, and is a convenient weight and size to be carried by rail flatcars which can carry 100 tons (assuming two containers per car). A similar container is also currently being used by the UMTRA Grand Junction project.

This pre-design proposes the use of a single 35 cubic yard reusable container-type to transport all waste, including high activity waste. Clean soil resulting from excavation of ramps and overburden is transported to local clean stockpiles using the same containers. All containers are carried on specially modified transport trailers equipped with locking devices to keep the container in place on the trailer. Each container is provided with an end gate to allow end-dumping at either the backfill storage area or at the disposal site. A cover is placed on the container before it is transferred to the rail car. The total weight of the container and lid will not exceed the 50 ton limit. Container design is discussed further in Section 6.2.1.1.

Decontamination and Rail Loading Facilities. Trucks with loaded containers leave the excavation site and move to the classification structure. At the classification structure, loaded containers from fringe zone of the excavation are counted with radionuclide detection instrumentation and sampled for chemical analysis in the on-site laboratory. Ten percent of the containers from the known contaminated zones are monitored and sampled at the classification structure. Containers which have been monitored and trucks which bypass the classification structure then move to the equipment decontamination station.

Prior to the equipment decontamination station, lids are placed on the containers. Then containers (and trucks to a lesser extent) are washed with water to remove exterior particulate contamination. Decontamination water is collected in a basin and pumped to a wastewater treatment system where additional solids settling occurs, thus clarifying the water. The clarified water is either recycled as wash water or is loaded out to trucks for use in excavation dust control. Samples of clarified water and settled solids are collected periodically and analyzed to determine contamination levels. Details of the decontamination operation are described in Section 6.3.

Following decontamination, the trucks carry contaminated material to the container transfer station where the covered containers are lifted from the trailers using container handlers (similar to forklifts, see Section 6.2.2). Containers are placed on the rail flatcars equipped with brackets on all four corners to secure the container from horizontal movement. An empty container received from the disposal site is placed on the truck and the truck then returns, following lid removal, to the excavation site for reloading.

Trucks containing clean soil from the excavation site move to the spoil stockpiles where containers are end-dumped using a hydraulic lift built-in to the trailer. Empty trucks return to the excavation site for reloading.

Rail Transport. Containers on railcars are shipped to the disposal facility where they are emptied, decontaminated (interior and exterior), and returned to the 100 B/C Area.

4.2.3 Analytical

A basic feature of the analytical approach is the real-time or near-real-time in situ characterization of contamination in support of continuous excavation operations. The analytical system concepts are being developed in a study separate from this pre-design and are documented in the *Large-Scale Remediation Analytical System Plan* (WHC 1993d). The analytical approach consists of:

- site modeling using prior data and data collected as excavation proceeds
- in situ monitoring and on-site laboratory analysis
- container monitoring and analysis (classification)
- air monitoring
- site closure monitoring and analysis.

Based on available characterization data, each waste site is modeled to identify the nature and levels of contamination. These models describe the expected volume of contamination and the expected concentrations and distributions of contaminants. A single indicator radionuclide (cesium-137) is chosen as the basis for real-time monitoring. Cesium-137 is a gamma emitter and is easily measured with field instrumentation. Concentrations of other radionuclides are derived using pre-defined concentration ratios between cesium and the other radionuclides. The model presents the best estimate of these ratios; then during remediation the model is refined as more data are collected.

Volatile and semi-volatile organic contaminants are measured with field screening instrumentation, i.e., flame- or photo-ionization detectors. Any material with positive screening results or which is known to contain organics is sampled and analyzed in the on-site lab for contaminant identification and quantification.

The only inorganic soil contaminant currently identified is hexavalent chromium. Field screening with X-ray fluorescence (XRF) instruments is used to monitor total chromium levels at waste sites suspected of containing chromium as a contaminant. Materials found to have total chromium concentrations exceeding regulatory limits for hexavalent chromium are assumed to be regulated with respect to chromium content. As information is gathered on different waste sites, the corresponding site models are updated.

In the case of a site with no characterization information (and no analogous sites), limited intrusive sampling is performed during excavation to build the site model. Initially, grab samples from many of the in situ monitoring locations are processed through the on-site lab to confirm the site conditions. The sampling will return to routine levels when the model adequately defines the waste site.

Solid waste sites require more extensive model development due to the limited information available and to the heterogeneous nature of the waste. However, because the waste is heterogeneous, the model will not attempt to characterize waste in great detail, but only to the extent necessary to support designation of waste type for disposal purposes. For example, the burial grounds are known to contain, as hazardous components, constituents such as cadmium, lead, and mercury. However, these constituents are present in metallic forms which are distributed throughout the buried waste in the major burial grounds (118-B-1 and 118-C-1 as well as some of the smaller burial grounds). It is not practical or cost effective to identify each metal piece. Therefore, buried waste known by process knowledge to contain hazardous constituents is designated as regulated for those constituents and handled accordingly.

Real-time monitoring (in situ monitoring) verified by on-site laboratory analyses is used for characterizing contaminated media during excavation operations. Prior to each excavation lift, in situ measurements for the indicator radionuclide (cesium-137) and screening measurements for chemical contaminants are made to verify the site model, control waste designation, and assure worker protection. Laboratory analysis is performed when real-time monitoring indicates that it is needed (i.e., for organics and transuranic [TRU] radionuclides) and for meeting quality assurance (QA) requirements.

Real-time monitoring of radionuclides consists of gamma spectroscopy for the cesium-137 indicator measurement using sodium iodide detectors connected to multi-channel analyzers; chemicals are detected with screening instruments such as photo-ionization detectors for organics and XRF for metals. During the excavation, air monitoring is performed for control of contamination spread and for worker protection. Air monitoring consists of both totalizing and personnel air samplers.

Container monitoring at the classification structure is used to verify the contents of selected waste containers. The monitoring strategy includes two types of analyses:

- verification analysis for materials with definite characteristics (i.e., definitely contaminated based on in situ measurements)
- identification analysis for materials from the transition zones between waste classes and between clean and contaminated areas (fringe).

Container monitoring is performed on 10% of the containers for verification sample analyses and on 100% of the containers from fringe areas for identification analyses. Container monitoring uses germanium detectors connected to multi-channel analyzers (MCA) for radionuclides and a rapid-turnaround on-site laboratory for chemical analyses.

After removal of the contaminated material from a waste site, site closure surveys are performed to verify that the remaining contamination is below cleanup limits. These surveys are conducted off-line from the excavation operations. The surveys are performed using in situ monitoring instruments with longer count times (for lower detection levels) and grab samples on a subset of the in situ monitoring points. Sufficient grab samples are collected for a 95% confidence level designation of the site. Analytical methods are sufficient for detailed chemical and radiological determination of all contaminants of concern (COC) to provide a defensible site closure record.

4.2.4 Waste Storage

Five areas are provided near selected burial grounds for waste storage (see Drawing H-1-80224). These areas are open but are marked appropriately when in use. When waste material is placed in a storage area, warning signs are used to alert personnel of the hazards contained within the area. The materials to be placed within the waste storage areas include the following:

- intact drums
- pressurized cylinders
- large size components with dose rates >1 R/hr that may be more effectively transported without containerizing in the standard bulk containers; an example would be the steam generator tubes from N Area buried in 118-B-1.

The waste storage areas may also be used as a laydown area for solid waste that must be size reduced before containerizing and shipping to Environmental Restoration Disposal Facility (ERDF). This use of waste storage is provided only as a contingency, because the baseline approach assumes that size reduction occurs in parallel with excavation at the excavation sites.

Although waste storage capability is provided for intact drums and pressurized cylinders, the possibility of encountering these is considered remote. All available information suggests that no cylinders and very few intact drums, if any, were disposed of in the 100 Area burial grounds.

The following paragraphs describe contingency methods for handling these special materials even though they are not likely to be encountered. These methods may need modification on a case-by-case basis as materials are encountered during actual excavation. The methods described below assume that materials requiring storage are only found in burial grounds and rarely occur. All waste storage activities are conducted off-line from excavation and demolition operations.

Intact Drums - Intact drums are assumed to contain liquids until proven otherwise. If they contain liquids, the liquids could leak if the drums are handled without special care. There is also concern that the drums may be pressurized and thus present explosive rupture hazards. When an excavator uncovers a drum (as determined visually), the excavation is stopped and the drum is inspected to determine if it is intact or already breached. If the drum appears to be intact, a removal strategy is assessed by field personnel. The drum is extracted, possibly using special devices such as a barrel-handler attachment, and placed in an overpack drum. The overpack is sealed and transported to the waste storage area for temporary storage until a handling procedure can be devised. While the drum is being extracted, the excavator is reassigned to a different area, if possible, to maintain production.

Pressurized Cylinders - Cylinders are assumed to contain pressurized liquids or gases until proven otherwise. When an excavator uncovers a cylinder (as determined visually), the excavation is stopped, all ground personnel and nearby equipment are evacuated from the affected area. The cylinder is inspected by the excavator operator to visually determine if it is intact or already breached. If intact, the cylinder is assumed to be pressurized and a removal strategy is devised by field personnel. The cylinder is carefully extracted from the excavation using the grapple attachment. This extraction method is considered intrinsically safe because of the distance of the operator from the cylinder and because of the inherent containment protection provided by the massive grapple attachment.

After the cylinder is extracted from the burial ground, the grapple operator moves it to the nearest storage area where it is placed for later management. Cylinders are stored in a condition that minimizes the effect of accidental discharge (such as confining the cylinder sides and allowing all explosive forces to be directed straight up into the air). Management of the cylinders depends on many factors including the contents and physical condition of the cylinder. Upon collection of cylinders, strategies for further management are devised which consider the specifics of the situation. Cylinder management services which include sampling and depressurization are commercially available and it is likely that these services would be procured.

Large Size High Dose Rate Components - These materials with dose rates exceeding 1 R/hr (e.g., possibly N Reactor steam generator tubes) may be more efficiently transported to the disposal site intact without size reducing them to fit in the transport containers. These materials may be placed in the waste storage areas until a case-by-case transport strategy is devised by operations personnel.

4.2.5 Treatment

Waste treatment is beyond the scope of this pre-design. At this point, no decisions have yet been made on the need for treatment of wastes prior to their disposal at the ERDF. Performance assessments related to the design of the ERDF are on-going. These studies along with continuing dialog and negotiations with the regulatory agencies will eventually determine treatment requirements, if any.

In the course of excavation of burial grounds, it is possible that special materials may be encountered which require additional processing or treatment prior to their transport to ERDF. Examples include intact drums of unknown content and compressed gas cylinders. Current knowledge of historical practices in the 100 Areas indicates that these materials are unlikely to be encountered in the burial grounds. However, in the event that these materials are encountered, it is intended that they be set aside temporarily under safe storage conditions in the waste storage area. As operations continue and depending upon the nature and volume of these special hazard materials, disposition will be determined on a case-by-case basis and appropriate processing schemes identified, if necessary.

As a contingency, the pre-design for the 100 B/C remedial systems provides a reserved area should treatment systems be required within the 100 B/C Area. This reserved area is indicated on the site plan given in Drawing H-1-80224.

4.3 EXCAVATION VOLUMES, RATES, AND DURATIONS

The excavation is performed according to the excavation strategy (Section 4.2.1) using sufficient numbers of equipment systems to complete remediation within five years. To determine the number of systems necessary to complete the 100 B/C Area remediation, the removal rates and volumes are required. However, the removal rate is variable depending on the type of material and the type of site. The following subsections define the material types, the site types, the removal rates, the excavated volumes, the durations, and number of equipment systems required.

4.3.1 Material and Site Types

Excavation or demolition rates differ according to the type of material being removed and the excavation or demolition process involved. For example, structure demolition is much slower on a cubic yard basis than soil excavation.

Based upon the differences in removal rates, the types of materials fall into the following categories:

- Overburden - Consists of the clean soil cover over a contaminated site. This layer of soil can generally be removed more quickly and easily than the contaminated soil.
- Ramp - Consists of clean soil removed to provide equipment access to the contaminated zone on sites which are excavated in lifts.
- Soil - Consists of contaminated soil within the contaminated zone and clean soil around the perimeter of the contaminated zone which must be removed to provide safe side slopes.
- Burial ground materials - Consists of all materials removed from the burial ground trenches and from the ash/coal pits used for disposal of waste materials from prior decommissioning activities.
- Metals - Consists of metallic materials from pipelines and structures (including steel retention basins as a result of demolition activities).
- Concrete - Consists of all concrete materials, reinforced or unreinforced, including structural members, foundations, and concrete pipe from demolition activities.
- Demolition materials handling - A separate rate is provided to account for loading of demolished materials.

Sites are categorized into five types as follows:

- Large Sites - The 116-B-11 and 116-C-5 retention basin sites.
- Medium Sites - All sites with excavated volumes >5,000 LCY with exception of retention basins. Includes pipelines and contaminated soils associated with pipeline leaks. Generally, "trench-type" sites.
- Small Sites - All small, pit type, excavations with excavated volumes <5,000 LCY (i.e., cribs and french drains) except sites with significant buried structures (such as outfall structures).
- Sites with buried structures - Sites with significant concrete or metal structures, such as an outfall structure, septic tank, or partially demolished ventilation stack.
- Burial grounds - Sites used for the disposal of solid waste, including burn pits, ash pits, and construction burial grounds.

Each of these material and/or site types requires a different mix of equipment and different excavation approaches to optimize efficiency and reduce waste volume. The excavation approach is interdependent with the analytical approach and both must occur in concert. The section below describes the details of the excavation strategy and the equipment for each material/site type.

4.3.2 Excavation Strategy by Material and Site Type

Major excavation and demolition equipment are categorized into five operational groups as follows:

Group No.	Equipment Items
E1	Excavator (backhoe)
E2	Bulldozer and wheel loader
E3	Excavator with grapple attachment; grapple sleeve or bucket is applied when handling soil
E4	Excavator with interchangeable demolition/processing attachments
E5	Excavator with mobile shear and densifier attachments.

The excavation strategy for each material and site type is graphically depicted in the block diagram of Figure 4-1. Note that this diagram is time sequenced, e.g., activities which line up vertically are conducted simultaneously. A description of the excavation process for each site type (and material types within site types) is given below.

4.3.2.1 Large Sites. The large sites consist of the concrete and steel retention basins. The retention basin fill is removed via the excavator with bucket attachment (E3) to expose the walls. In parallel with basin fill removal, the concrete walls are demolished with the excavator (E4) fitted with either the hydraulic hammer for thick concrete sections or the pulverizer for thinner sections. The steel walls are cut with the excavator/shear (E5) combination. Demolished materials and basin fill are loaded into containers with the E3 group.

Once the basin structures have been removed, the excavation proceeds to remove contaminated soil beneath the basins. This excavation process is illustrated in Figure 4-2. The excavation proceeds in shallow one foot lifts using both the dozer/loader (E2) and the backhoe (E1). The dozer/loader group (E2) is used in the center of the contaminated plume. This group operates in tandem with the analytical vehicle which follows behind the excavation equipment monitoring the freshly excavated surfaces as they are being uncovered. This in situ monitoring information is then used to guide excavation for subsequent lifts. Stakes or paint which mark the measured perimeter of the contaminated zone are placed at the edges of the contamination and serve as a guide to excavation.

The backhoe (E1) is used to remove and segregate materials in the fringe area (defined as a 10 ft band at the interface between the contaminated and clean zones). It is also used to excavate the clean material outside the contaminated zone (designated as the "clean wedge" in Figure 4-2). The dozer/loader group (E2) is used to construct the ramp into the excavation. As the excavation becomes deeper, the ramp is made deeper and longer to access the increasing depth, maintaining a consistent grade (maximum 10%) over which the haul trucks can maneuver.

4.3.2.2 Medium Sites. The overburden from medium sites is removed with the dozer/loader group (E2). Overburden is moved either to a local stockpile near the site or to a central stockpile of clean soil. Following overburden removal, all subsequent excavation uses the backhoe (E1). Excavation proceeds in one foot lifts and in situ monitoring via the monitoring vehicle is used to stake the edges of the contamination. Ramps are maintained using the dozer/loader (E2). Ramp material is stockpiled at the sides of the ramp.

Pipelines are a special case of medium sites. Excavation of overburden proceeds in a similar manner to other medium sites (using dozer/loader E2), except that upon reaching the top of the pipe, the pipe is completely uncovered with the backhoe (E1) (see Figure 4-3). The excavator with shear attachment E5 is used to cut the pipe and the excavator with grapple attachment (E3) is used to remove the pipe; the pipe is laid down at the surface. A 10% ramp is constructed to the depth of the removed overburden to maintain truck access. Once the pipe is removed, a 20% slope ramp is constructed to the bottom of the excavation to allow access by the monitoring vehicle. The excavation then proceeds as necessary to remove soil contamination resulting from pipe leaks. If the soil contamination depth exceeds the reach of the backhoe, a 10% ramp is constructed to the bottom to allow equipment and truck access to complete the excavation. The removed sections of concrete and steel pipelines are processed at the surface with demolition equipment (pulverizer E4 or shear/densifier E5) to further cut and/or crush the pipe for container transport. Processed pipe material is loaded into containers with the grapple (E3).

4.3.2.3 Small Sites. The backhoe (E1) is used for all phases of excavating small sites (see Figure 4-4). Initially, excavation proceeds in shallow lifts until the accessible clean overburden is removed. Excavation then proceeds from the surface to the full depth of the contamination. Monitoring is provided by boom-mounted instruments on a separate remote monitoring vehicle. If the depth of contamination is greater than the backhoe reach, the site is benched (including 10% ramp) to provide a new surface for backhoe operation. A 20% ramp is constructed from surface of the excavation bench to the bottom of the excavation to provide equipment and monitoring vehicle access to the bottom of the excavation.

4.3.2.4 Sites With Structures. The excavator with bucket attachment (E3) is used to remove soil from around structures. Demolition attachments (E4) such as pulverizers or shears are used to demolish the structures. Demolition debris is loaded into containers with the E3 group. Soil beneath structures is subsequently excavated in the same manner as a small soil site.

4.3.2.5 Burial Grounds. Overburden removal and ramp excavation in burial grounds (see Figure 4-5) is conducted in the same manner as medium sites, i.e., using the dozer/loader group (E2). Operating from the new bench formed after overburden removal, the excavator/grapple or bucket group (E3) is used to remove the buried waste and/or soil between waste trenches. A boom-mounted probe operated from a remote monitoring vehicle is used for in situ monitoring of contamination levels in the waste trenches. A 10% ramp is used for vehicle access to the excavator bench and a 20% ramp is constructed to the bottom of the excavation to allow access for final monitoring.

Oversize objects removed from the waste trenches are processed at the surface using the E4 group. Solid waste is loaded into containers using the E3 group. The N Reactor steam generator tubes disposed in the 118-B-1 burial ground represent a special case which will be investigated to determine whether special handling is warranted.

4.3.3 Removal Rates

The removal rates are based on the following elements:

- calculations for a typical site using the excavation strategy described in Section 4.2.1
- assumed equipment and material types.

Because excavation conditions vary significantly between large, medium, and small soil sites, specific removal rates for each of these are defined. Table 4-2 lists the removal rates and the calculation basis for each type of site.

4.3.4 Excavated Volumes

To identify the time required to complete the excavation or demolition of a waste site (duration), the excavated volumes are tallied for the material types defined in Section 4.3.1. The excavated volume includes all materials removed. This volume depends on the extent and depth of the contamination, the clean material removed to maintain safe side slopes for the excavation, the size and depth of the access ramps, and any interferences with other sites or systems/facilities. With exception of overburden removal, the excavation strategies differ depending on the type of site.

The excavation rates assume that large and medium soil sites are excavated in one foot deep lifts from the onset of contamination down to the depth of contamination or to groundwater (whichever comes first). Small soil sites and burial grounds are excavated from the surface using full vertical cuts with backhoes.

All excavations are constructed with 1.5/1 side slopes, the assumed excavation slope angle for the material and the OSHA slope angle recommended for worker safety. Access ramps are constructed at a 10% slope with 1.5/1 side slopes to provide access for haul trucks. Access ramps for large and medium soil sites extend to the bottom of the excavation so that the full excavation can be done in shallow lifts. Access ramps with a 20% slope are constructed to the bottom of the small sites to provide access by the monitoring vehicle.

Table 4-3 lists the excavated volumes for each site. Details of volume estimate calculations are given in Attachment 1 (Volume 2). All volumes in Table 4-3 are given in LCY (the as-excavated volume). These volumes are converted from bank cubic yards (BCY) (the in situ volume) to LCY based on application of swell factors, i.e., the percentage increase in volume as a result of excavation/demolition. Swell factors are given in Section 3.7.5.

The interferences for the waste sites are discussed in Section 4.6. Site-to-site overlaps have not been considered in the excavated volume estimates; however, analysis of these overlaps indicates that the incremental volumes are not significant when considered within the overall uncertainty in waste volumes. Therefore, it is not intended that the excavated waste volumes be adjusted to consider the overlaps.

4.3.5 Excavation Duration

The 100 B/C Area remediation is to occur over a five year period according to the pre-design guidance (WHC 1993a). Calculations of excavation durations are based on the following parameters:

- the remedial system will operate throughout the year
- standard work-week is Monday through Friday
- ten holidays per year; 250 possible operating days
- it is assumed that inclement weather will result in 20% downtime or 50 days; net operating days = 200

- operations for the demonstration phase (first year of operation) will occur in one shift per day (total of 200 operating shifts in the first year)

- operations for the remediation phase (second year and beyond) will occur in two shifts per day (total of 400 operating shifts per year)

- in the final (fifth) year, excavation operations will be conducted over two shifts per day for the first six months of the year (total of 200 operating shifts). The final six months is reserved for completion of site reclamation and project closeout

- each shift is eight hours; productive time is seven, 45-minute periods, with a net production time of 5.25 hours per shift. Non-productive time is assumed to be associated with clothing changes, breaks, safety meetings, and other activities related to personnel safety and radiation protection.

Based on the above assumptions, over the five years given to complete this project, there will be a total of 1,600 shifts worked or total of 8,400 productive hours worked. Table 4-4 summarizes the durations for each equipment group.

4.4 COORDINATION WITH OTHER PROGRAMS

Successful completion of the remedial activities in the 100 B/C Area will require coordination with the following:

- D&D program
- remedial investigation/feasibility study (RI/FS) programs
- maintenance of active systems in the 100 B/C Area
- ERDF
- site services.

The following subsections detail the coordination requirements for each activity. Remedial operations must coordinate with these activities to allow each program to accomplish the desired goals without duplication of effort or undue interferences.

4.4.1 Decontamination and Decommissioning Program

The D&D Program is managed by Hanford Restoration Operations of WHC. Hanford Restoration Operations performs the necessary surveillance and maintenance, decommissioning and environmental restoration field operations at the Hanford Site. Table 3-1 lists the responsible program for each facility in the 100 B/C Area. The facilities under D&D management are scheduled for decommissioning according to the *Surplus Facilities Program Plan Fiscal Year 1993* (Winship et al. 1992) and any subsequent drafts.

4.4.2 CERCLA Remedial Investigation/Feasibility Study Program

The activities scheduled for the 100 B/C Area under the RI/FS program are identified in the RI/FS work plans for the operable units within the 100 B/C Area. The work plans are listed as follows:

- 100-BC-1 (DOE-RL 1992b)
- 100-BC-2 (DOE-RL 1993a)
- 100-BC-5 (DOE-RL 1992a).

The 100 Area RI/FS activities include:

- treatability studies
- FS
- LFI
- interim remedial measures (IRM) and expedited response actions (ERA).

Treatability studies for 100 Areas are described in the *Treatability Study Program Plan* (DOE-RL 1992c). Specific treatability studies, which could impact 100 B/C remediation, include the *100 Area Soil Washing Treatability Test Plan* (DOE-RL 1992d) and the *100 Area Excavation Treatability Test Plan* (DOE-RL 1993b).

Remedial alternatives for 100 Area operable units are evaluated in the *100 Area Feasibility Study Phases 1 and 2* (DOE-RL 1992e).

Limited field investigations for the 100-BC-1 and 100-BC-5 operable units are complete and are documented in DOE-RL 1993c and DOE-RL 1993d, respectively. The LFI for the 100-BC-2 operable unit is currently on-going.

The *Hanford Site Past-Practice Strategy* (DOE-RL 1991) specifies that IRM and ERA be performed in the 100 Areas. Interim remedial measure planning for the 100 Area is documented in the *100 Area Interim Remedial Measure Program Plan* (DOE-RL 1992f). Specific IRM decisions will be documented in an interim record of decision (IROD). Expedited response actions, if any, will be identified in an ERA proposal and documented in an Action Memorandum. It is intended that the LSR approach for the 100 B/C Area constitute an alternative in the 100-BC-1 and 100-BC-2 Operable Units Focused Feasibility Studies. In accordance with CERCLA documentation requirements, the remedial decision for the 100 B/C Area would be documented in a proposed plan and record of decision (ROD) for the 100 B/C Area which would effectively constitute a final ROD for both the 100-BC-1 and 100-BC-2 operable units.

4.4.3 Active Systems

The 100 B/C Area contains several active systems. Many of these systems will remain active throughout the remediation program. These active systems are indicated on controlled drawings numbered H-1-80212, H-1-80213, H-1-80214, and H-1-80215.

Coordination for use of these systems can be accomplished through the following WHC organizations:

- Electrical Utilities Engineering
- Network Engineering and Technology
- Steam & Water Utilities and Export Water
- Inactive Facilities Surveillance and Maintenance
- Rail Operations and Maintenance.

4.4.4 Environmental Restoration Disposal Facility

The regulated material generated during remediation of the 100 B/C Area will be disposed at the ERDF. This facility is in the planning/design stages and will be located near the 200 Area of the Hanford Site. The ERDF design is being performed under the direction of the U.S. Army Corps of Engineers. Design criteria for the ERDF are defined in *Environmental Restoration Storage and Disposal Facility Functional Design Criteria* (WHC 1993g). The requirements for disposal at the ERDF must be closely coordinated with this pre-design and the analytical system program plan (WHC 1993d).

4.4.5 Site Services

Several services required for support of the remediation project are assumed to be supplied by existing Hanford organizations. Examples of these services include security, communications, facility maintenance, rail maintenance, and sanitation. These services are discussed in Section 6.6.2. Currently, there is no central point of contact for all services, as each organization establishes its own contact personnel.

4.5 EXCAVATION PLAN

The objective of the excavation approach is to remove contamination from waste sites (at its "probable" extent) while minimizing the volumes of material removed using standard excavating techniques. The following sections discuss the plan for development of the waste site excavations, associated access and vehicle routing requirements, additional site grading requirements, and the distribution plan for the spoils obtained.

4.5.1 Waste Site Excavations

The excavation plan is shown on Drawing H-1-80227, Sheets 1 to 8. The drawing represents the probable extent of the excavation and the drawing views presented do not account for contemporaneous backfilling of the excavations. The actual appearance of the excavations at any given time depends on the sequence of waste site excavations, closure criteria, the sequence of backfilling, and the actual extent of the contaminated material and additional access requirements which may be identified as a result of any variation in these criteria.

Site-to-site overlaps produce the appearance of one continuous excavation where many of the sites may appear to be excavated at one time. The actual approach depends on the ability to segment regions of the excavation, such as the effluent pipelines, and provide closure for those segments. Sites which are close together, such as 116-B-6A, 116-B-6B, 116-B-16, and 118-B-7, may not require simultaneous excavation. However, the degree of influence shared by adjacent sites will determine the specific excavation and closure strategies for those sites.

The geometry of the excavation and the associated access ramps also varies over the course of the project as excavation extends in depth. Generally, access becomes more restricted as excavation progresses, especially in the smaller sites. Limited but adequate access, with respect to the design parameters, is assumed in this preliminary design. It is not cost effective to design for more extensive access at the maximum extent of the excavation, because the imposition of restricted work space is short in duration.

For spoil management purposes, the effluent pipelines are divided into 11 segments (See Section 4.5.4). Restrictions imposed by the presence of the reactor buildings inhibits the removal of those portions of the process effluent lines which are close to the buildings. Therefore, removal of these lines and associated contaminated material would be more effectively accomplished in conjunction with the D&D activities associated with the affected buildings.

Access to the larger site excavations is provided by wide, shallow grade ramps. As excavation proceeds, haul trucks may simultaneously enter and exit via the ramp. Sufficient space exists within the excavation for trucks to turn. In smaller site excavations trucks may be unable to turn within the excavation as it reaches its maximum extent. These sites are developed similarly to the larger sites until the excavation reaches maximum extent at which time the haul trucks must back down the ramp or the excavation equipment must haul material up the ramp. For very small site excavations, only narrow, steep ramps are provided. These ramps provide short, steep access for excavating and monitoring equipment.

4.5.2 Grading and Drainage

No significant site grading is required to control the run-on or run-off of surface water from the excavations. The potential for significant overland flow and ponding of water in excavations is low due to the high hydraulic conductivity of site soils and the low incidence of high precipitation events. In addition, no major drainage ways transect the excavated area. During excavation, berms and/or ditches will be placed upgradient of waste sites, if required, as a precaution to minimize the amount of water entering the excavation. No provisions are necessary to dewater excavations.

4.5.3 Vehicle Routing

During the excavation of the waste sites, trucks hauling material from the waste sites to the container transfer area travel along a series of improved haul roads. Access from these haul roads to the local stockpiles and to the waste site excavations is provided by more temporary and less improved site access roads. The general layout of the haul roads and site access roads is shown on Drawing H-1-80242.

The majority of the haul roads consist of existing routes which will be upgraded. Four east-west routes, designated Routes A, B, C, and D in the drawing, run from the waste site locations to a main north-south route. The north-south route uses the eastern site perimeter roads to provide two one-way roadways designated Route N and Route S. This route directs traffic to Route L which passes through the classification and decontamination areas to the container transfer area. Routes A, B, and D are existing paved roadways. These roadways will be widened to 12 m using the existing paved section as the center of the roadway. Route C presently exists as a site access road; this road will be graded similar to Routes A, B, and D. Routes N and S will be maintained at their present width of about 6 m. Route N does not presently exist north of Route 1. All haul roads will be improved with the use of suitable structural fill and road base course to provide a durable surface for repeated use by the haul trucks over the course of the project. Haul road design incorporates a minimum turning radius of 15 m.

A minimum number of site access roads are shown on the drawing (H-1-80242). These roads consist of routes in which a minimum of improvement will be completed. Additional areas which may be required to turn trucks or temporarily lay down equipment are not shown. Site soils consist of materials which are suitable as temporary road surfaces with a minimum of grading or improvement. Some areas which are excessively sandy will require stabilization or replacement. The site access roads shown accommodate a minimum turning radius of 15 m.

The use of the site roads varies according to the sequence of the excavation; this use is depicted on Drawing H-1-80222. Excavation of the effluent lines precludes the use of Routes B and C as access routes to the western portion of the site. Sites in the west requiring the use of these routes either must be completed before the roadway is disrupted or the roadway must be restored.

4.5.4 Spoil Stockpiles

A total of about 1.5 million LCY of clean material is derived from the excavation and is stockpiled on site. About 90% of this material is stockpiled close to the source of excavation in local stockpiles (about 1.4 million LCY), the remainder is stockpiled at a central location near the classification structure (about 0.1 million LCY). Locations of all spoil stockpiles are shown on Drawing H-1-80223. The dimensions of the areas depicted accommodate the amount of clean material associated with the probable extent of contamination. The central stockpile area is oversized and can provide up to 50% of the total spoil generated, if required.

No attempt is made to segregate stockpiled material by type. Little to no topsoil exists over the planned extent of the excavation and there is no significant advantage to segregating any other materials.

4.6 SITE INTERFERENCES

Excavation of 100 B/C waste sites must consider interferences posed by structures, overhead and buried utilities, railroads, access roads, monitoring wells, and process pipelines (such as water, sewer, and vent). Drawing H-1-80217 presents a plan view of the interferences for all excavations within the 100 B/C Area. These interferences complicate the excavation. However, the complications are generally minor where the interference is an inactive system which can be removed as the excavation proceeds. The interference has greater impact when it is an active system which must be preserved or is a system, such as an active water line, which could cause damage if the system is compromised.

Active system interferences include haul roads, overhead electric lines, buried telephone cables, the export water line, firewater lines, and groundwater monitoring wells. Strategies for managing interferences are discussed in the paragraphs below.

All groundwater monitoring wells interfering with excavations and regrading will be destroyed during the excavation. Destruction will include grouting of portions extending below the excavation in accordance with state regulations. Some of these wells may be required after the remediation activities are complete. If so, new wells will be installed as necessary after site closure.

Westinghouse Hanford Company is currently planning to install new fiber optic telephone lines to service the 100 B/C Area. These lines will be planned and installed to avoid all proposed excavations. Therefore, all current lines will be inactive by the time excavation operations begins and so can be destroyed during the excavation.

The excavations are sequenced such that affected haul roads can be deactivated and haul routes revised during the affected sequence.

Site-specific strategies for other types of excavation interferences are described as follows:

> <u>126-B-1</u> - Overhead electric lines run between 151-B and the 181-B/181-C facilities. As currently proposed, the ramp to the excavation crosses this line (a power pole is directly in the center of the ramp). The excavation ramp to the north or west will be rerouted to avoid the power line.
>
> <u>132-B-3</u> - An active 8 in sewer line runs north from the B Reactor, along the edge of the 132-B-3 excavation, to the 1607-B2 septic tank. The line is slightly outside the proposed excavation. Excavation will proceed carefully in this area to avoid damaging the line.

120-B-1 - As currently located on the drawings, the 120-B-1 excavation interferes with a 10 in fire water line and fire hydrant, overhead electric lines and power poles, and a 6 in sanitary sewer line. These lines supply the B Reactor, the 190-C building, or both. The fire water, sewer, and electric lines will be rerouted to avoid the interferences.

Effluent Pipeline North of B Reactor - An 8 in firewater line and fire hydrant are located within the western portion of the excavation. The fire hydrant and associated piping can be easily relocated outside the excavation to maintain fire water capabilities.

Effluent Pipeline North of C Reactor - The 230 Kv overhead electric line from the 151-B Building to the site substation crosses the pipeline excavation prior to exiting the 100 B/C Area. The 42 in export water line from the 182-B facility also crosses this excavation. The export water line near the excavation will be isolated; during the excavation this export line will be shut-in and the backup water system in the D Area used to supply water to the 200 Area. The shut-in export line will be then shored as excavation proceeds carefully around the line to avoid damage.
Operations under the power lines will maintain the required 14 ft clearance.

1607-B8 - Overhead electric line feeding the 190-C Building runs along the eastern side of the proposed excavation. The lines will be relocated to the outside of the excavation.

4.7 EXCAVATION SEQUENCING

This section describes the procedure and results for evaluation of excavation sequencing. The Primavera Project Planner® (P3), Version 5.1, is used for sequencing the excavation activities due to its flexibility in resource leveling and calendar definition.

The purpose of the excavation activity sequencing is to determine the numbers of excavation and demolition equipment required to complete the project within the prescribed timeframe. No attempt was made to optimize equipment utilization and material production. Additional iterations of the sequencing work will be required to attain a higher degree of optimization with respect to these parameters.

4.7.1 Sequencing Criteria

The following definitions were considered in development of the sequencing plan using the P3 program:

Resources. Defined in the P3 dictionary as the excavation and demolition operational equipment groups (See Section 4.3.2).

Site Type. Defined as small, medium, large, sites with structures, and burial grounds. All waste sites are assigned to one of the five site types (See Section 4.3.1).

Activities. The excavation process diagram, as shown in Figure 4-1, identifies the activities associated with each site type and the resources required for each activity. The duration of each activity is calculated based on the volume estimate and the equipment rate. The durations are summarized in Table 4-5.

Learning Curve. Assumes that the learning process results in a 10% loss of available work days during the first year and that 75% of the lost days occur in the first half of the FY (October - April). The lost days are spread uniformly throughout the applicable period.

Ramp Up. Defines the resource inventory requirements; the first year requires an inventory of one of each resource. Inventory is supplemented after year one to accommodate scheduling requirements.

Schedule. In year one, FY 1997, operations are conducted in one shift per day. In the remaining years of the five-year project, operations are conducted on a two shift per day basis. Activities are not scheduled on weekends or holidays.

Weather. Occasional shutdowns occur due to inclement weather. It is assumed that 20% of the available time is lost due to weather shutdowns and that all weather delays occur during the spring and fall.

Demonstration/Remediation Phases. All systems, components, and procedures are developed and proven to be workable for each site type during the demonstration phase (year one). The remediation phase follows the demonstration phase and focuses on completion of site remediation and restoration.

Reclamation. Reclamation includes site closure monitoring, recontouring, and revegetation. These activities last approximately six months after the last site has been remediated. (Three months for analytical, two months for recontouring, and one month for revegetation.) This constraint requires an excavation completion date of April 2001.

The P3 logic for the sequencing of activities includes the following requirements:

Site Methodology. Provides the logic of the excavation strategy within each site type, e.g., a medium site requires that the ramp/overburden be removed prior to excavation. Upon initiation of waste site remediation, it is required that activities be continuous until completion, i.e., excavations are worked to completion once started. A more detailed discussion of the site methodology is provided in Section 4.3.2.

Demonstration Phase. Defines and schedules the demonstration activities to be completed during the first year. A large site will not be included in this phase because all of the activities of large site remediation can be adequately demonstrated during demonstrations at the smaller sites.

The considerations for determining the sites to be included in the demonstration phase are listed as follows:

- proximity of sites
- size in comparison to others in the same site type
- complexity of excavation in comparison to others in the same site type.

The following four sites are selected for the demonstration phase:

- 116-B-3: small site
- 116-B-2: medium site
- 132-B-3: sites with structures
- 126-B-3: burial ground.

Remediation Phase. After completion of the demonstration phase on a site type, the remediation phase is initiated. Waste sites are grouped into four general areas:

- retention basin area
- B Reactor Area
- C Reactor Area
- outliers, septic tanks and pipelines.

  Preference is given to starting the next activity which is in the same group as the activity being completed.

  The waste sites within each group are listed below:

- Retention basin area: 116-B-1, 116-B-7, 116-B-11, 116-C-1, 116-C-5, 128-B-1, 132-B-6, and 132-C-2

- B Reactor Area: 116-B-4, 116-B-5, 116-B-6A, 116-B-6B, 116-B-9, 116-B-10, 116-B-12, 116-B-16, 118-B-2, 118-B-3, 118-B-4, 118-B-5, 118-B-6, 118-B-7, and 118-B-10

- C Reactor Area: 116-C-2A, 116-C-2B, 116-C-2C, 118-C-1, 118-C-2, 118-C-4, and 132-C-1

- Outliers, septic tanks and pipelines: 118-B-1, 120-B-1, 126-B-1, 126-B-3, 128-B-2, 128-B-3, 128-C-1, 1607-B-1, 1607-B-3, 1607-B7, 1607-B8, 1607-B9, 1607-B-10, 1607-B-11, 600-33, and pipelines.

Decontamination and Decommissioning. Identifies the D&D activities being performed during FY 1997 through 2001 by showing an FY milestone on the schedule for the activity. Refer to Sections 3.1.2 and 4.4.1 for definition of the activities and the D&D interface. Verifies that the scheduled remediation activities are not impacted by the D&D activities.

The sequencing plan generated based on the above definitions and requirements is reviewed for optimization of activities and resources. The schedule is arranged to maximize resource usage and minimize waste site remediation time.

4.7.2 Evaluation and Results

The sequencing plan resulting from consideration of the definitions, requirements, and optimization aspects discussed above is given in Sheet 1 of Drawing H-1-80222. The sequences are also grouped by fiscal year on a 100 B/C Area plot plan by highlighting the waste site excavations which are active in each year (see Sheets 2 through 6 of Drawing H-1-80222).

4.7.2.1 Resource Requirements. Evaluation of the sequencing plan provides the following resource requirements:

- E1 (excavator) - One unit required throughout the project life
- E2 (bulldozer/wheel loader) - One unit required throughout the project life
- E3 (excavator with grapple) - One unit required during FY 1997; three units required during FY 1998 through 2001
- E4 (excavator with interchangeable demolition/processing attachments) - One unit required during FY 1997; two units required during FY 1998 through 2000; three units required during FY 2001
- E5 (excavator with shear and densifier) - One unit required during FY 1999 and 2001.

4.7.2.2 Production Rate. Evaluation of the sequencing plan provides a basis for determining production rates. Production rates are further used to estimate quantities of containers, trucks, and railcars.

Production rates are calculated based on quantity of material hauled and based on equipment utilization. These production rates are then evaluated to determine a design and a peak rate.

The production rate (in LCY/shift) based on material hauling is based on the following steps:

1. group the fiscal years as 1) 1997 and 2) 1998 through 2001

2. determine material generation rates in LCY/month based on the sequencing plan

3. determine the number of operating shifts per month based on the calendar defined in the P3 sequencing program

4. calculate LCY/shift for each month based on Steps 3 and 4

5. determine the median and average production rates for each month during FY group two

6. determine a "3 month" production rate, i.e., operating periods of 3 months or more where production rates are maintained at a rate which is consistent and higher than the average or median

7. determine the peak (maximum) monthly rate.

The results of these calculation steps are summarized as follows:

	LCY/shift
Median	2,343
Average	2,410
Maximum	4,918
3 month	3,900

The equipment loading based production rate is calculated based on the following steps:

1. review the sequence plan and select months where equipment are being fully utilized

2. determine the activities occurring during the months selected

3. determine the equipment loading rates based on the site type and activity

4. summarize the equipment loading rates for each selected month to provide a production rate.

The calculated rates based on these steps are as follows:

Month	LCY/shift
January 1999	4,800
June 1999	4,500
September 2000	4,300

Based on the review of production rates calculated by the two methods, the following rates are determined:

- A design rate of 3,900 LCY/shift is selected for FY 1998-2001 based on the 3 month production rate.

- A design rate of 1,950 LCY/shift is selected for FY 1997 (one-half the rate for FY 1998-2001).

- A peak rate of 4,918 LCY/shift based on the maximum material generation rate.

Based on the calendar defined in the P3 sequencing program, the number of operating shifts by FY is tabulated as follows:

FY	No.of Shifts
1997	183
1998	404
1999	406
2000	408
2001	258
TOTAL	1,659

4.7.2.3 Cycle Times. To determine quantities of containers and trucks, estimates of cycle times for material movement must be made.

Excavated materials travel in containers on trucks in three separate paths depending upon the final disposition of the material. These paths are defined as follows:

Disposal Site

- container filling
- haul to classification structure
- monitor container
- place lid
- decontaminate container exterior
- survey container
- haul to container transfer area
- transfer filled container to rail car
- transfer empty container to truck
- remove lid from container
- return to excavation site.

Central Clean Stockpile

- container filling
- haul to classification structure (if fringe material)
- monitor container
- haul to central stockpile (area spoil).

- dump material at stockpile
- return to excavation site.

Local Clean Stockpile

- container filling
- haul to local spoil stockpile
- dump material at stockpile
- return to excavation site.

The path options and cycle times for each material handling path are shown on Figure 4-6. The basis for the estimates of cycle times is given as follows:

- The container filling cycle time is based on the rate of soil loading with the excavator which has the smallest bucket capacity.

- Distance from the excavation site to the classification structure is 2000 meters which is the average for the larger sites furthest away from the structure. Truck speeds are based on table values provided by vendors.

- The classification, lid placement, and decontamination area are approximately 1400 meters from the container transfer area. The time frame at each segment is based on the amount of time required to perform the activity for each container.

- Maximum travel time to and from the spoil stockpile areas is based on the furthest site distance.

- Time spent at the local spoil stockpile includes maneuvering the container and end-dumping.

- Container surveying time is based on estimates provided by WHC's health physics (HP) group.

- Cycle time at the container transfer area includes loading a filled container on the rail car, loading an empty container on the truck, and removing the lid.

The cycle time estimates provide the following results:

- The maximum round trip cycle time from the waste site to the container transfer area is 43 min assuming that the container is monitored at the classification structure and full container surveying is performed.

- The maximum round trip cycle time from the waste site to the central stockpile is 19.5 min.

- Bypass of the container monitoring step (for material whose waste class can be adequately determined from in situ monitoring) reduces the cycle time 2 min.
- Bypass of the surveying step reduces the cycle time 15 min.
- The shortest cycle time (13.5 min.) occurs in the case of the material moving to the local pile.

Figure 4-1 Excavation Flow Diagram

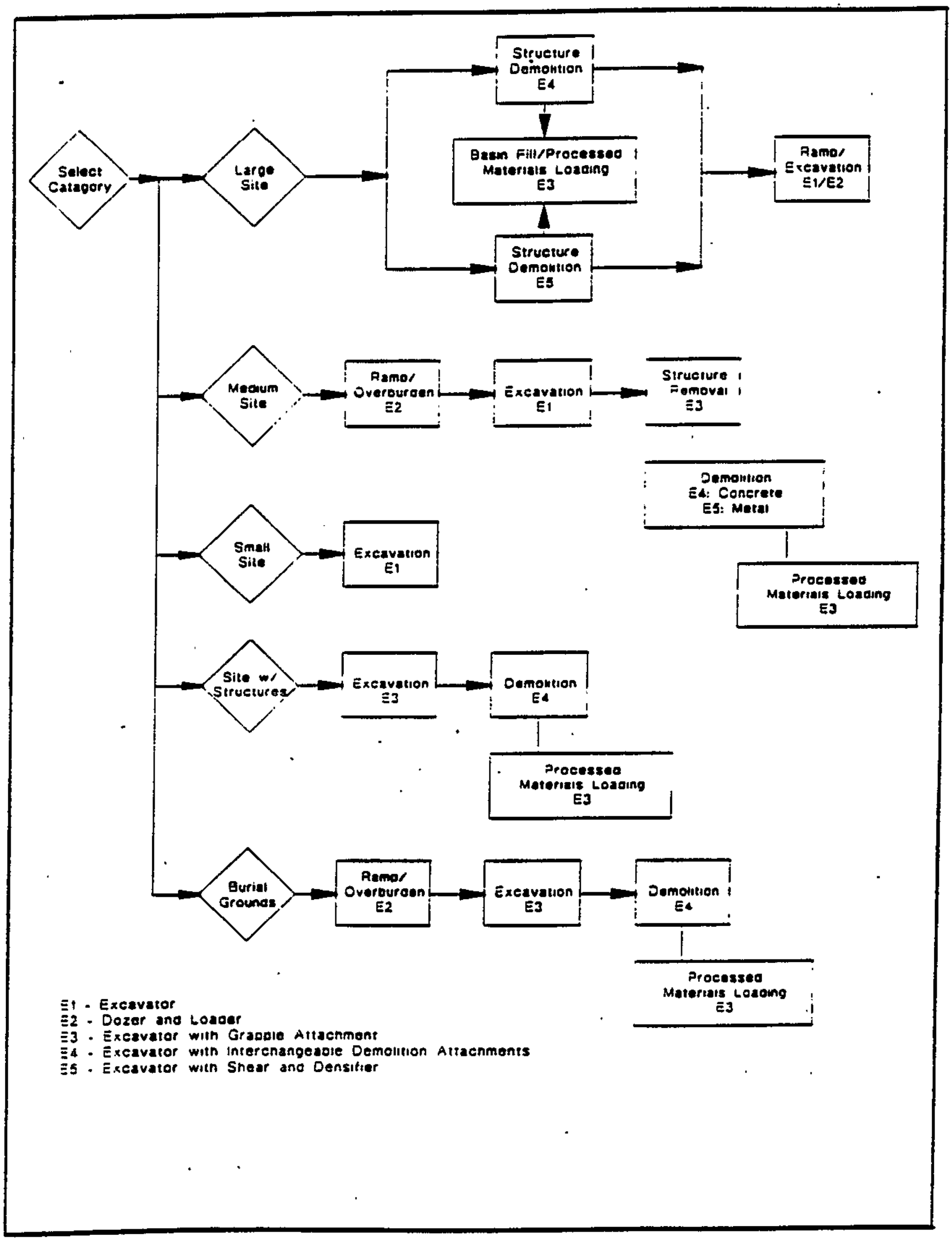
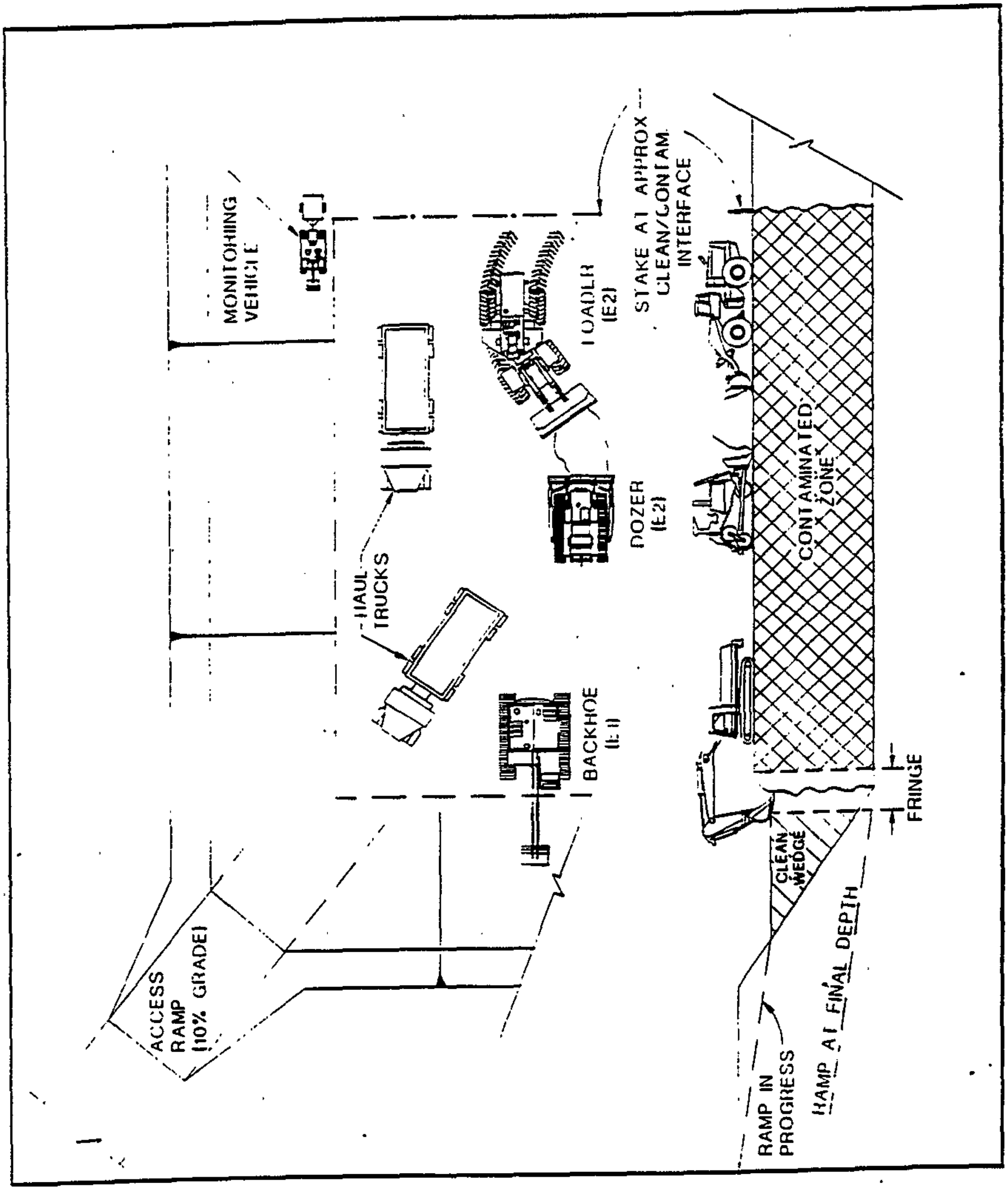


Figure 4-2 Large Site Excavation Approach



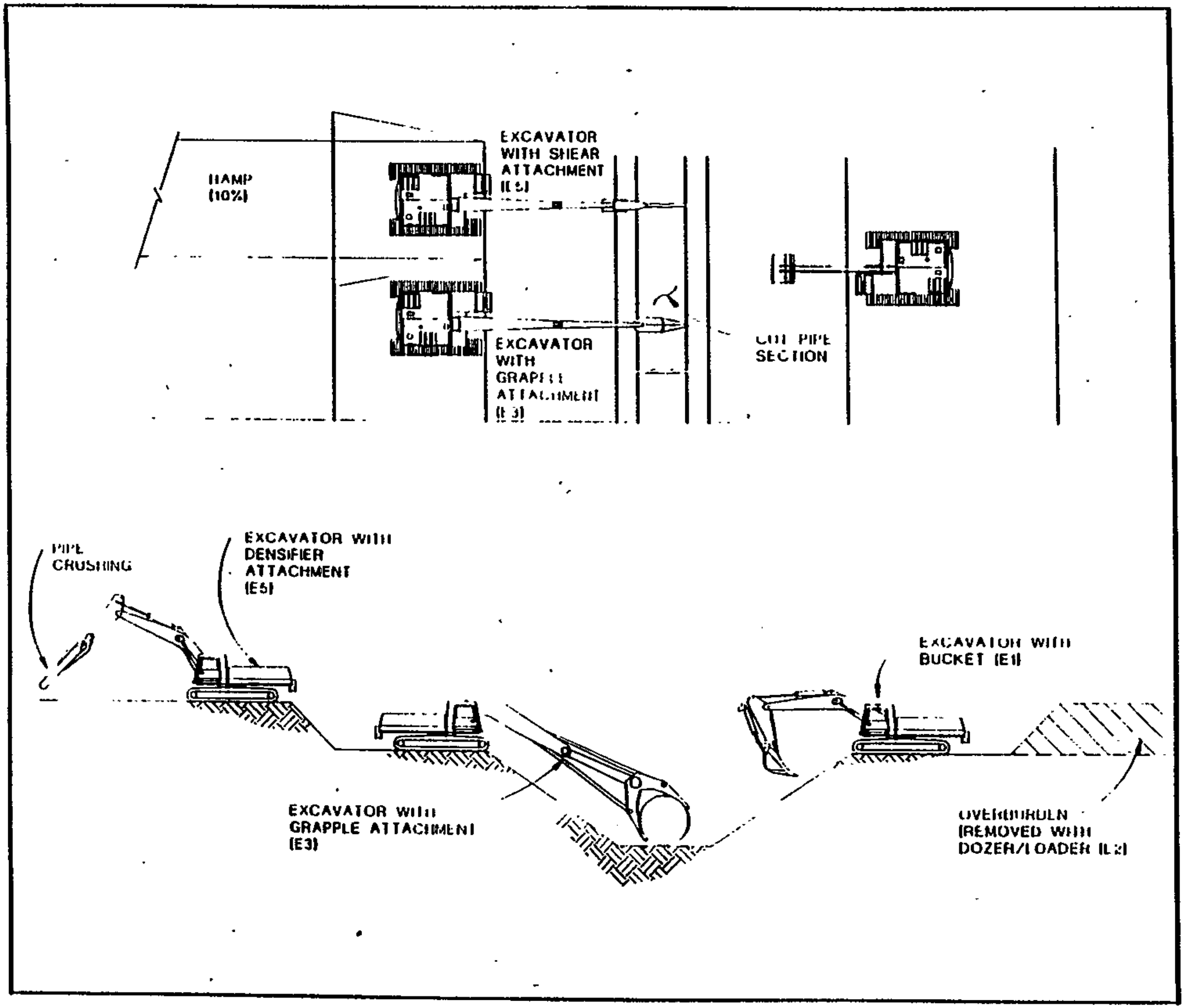


Figure 4-3 Pipeline Removal Approach

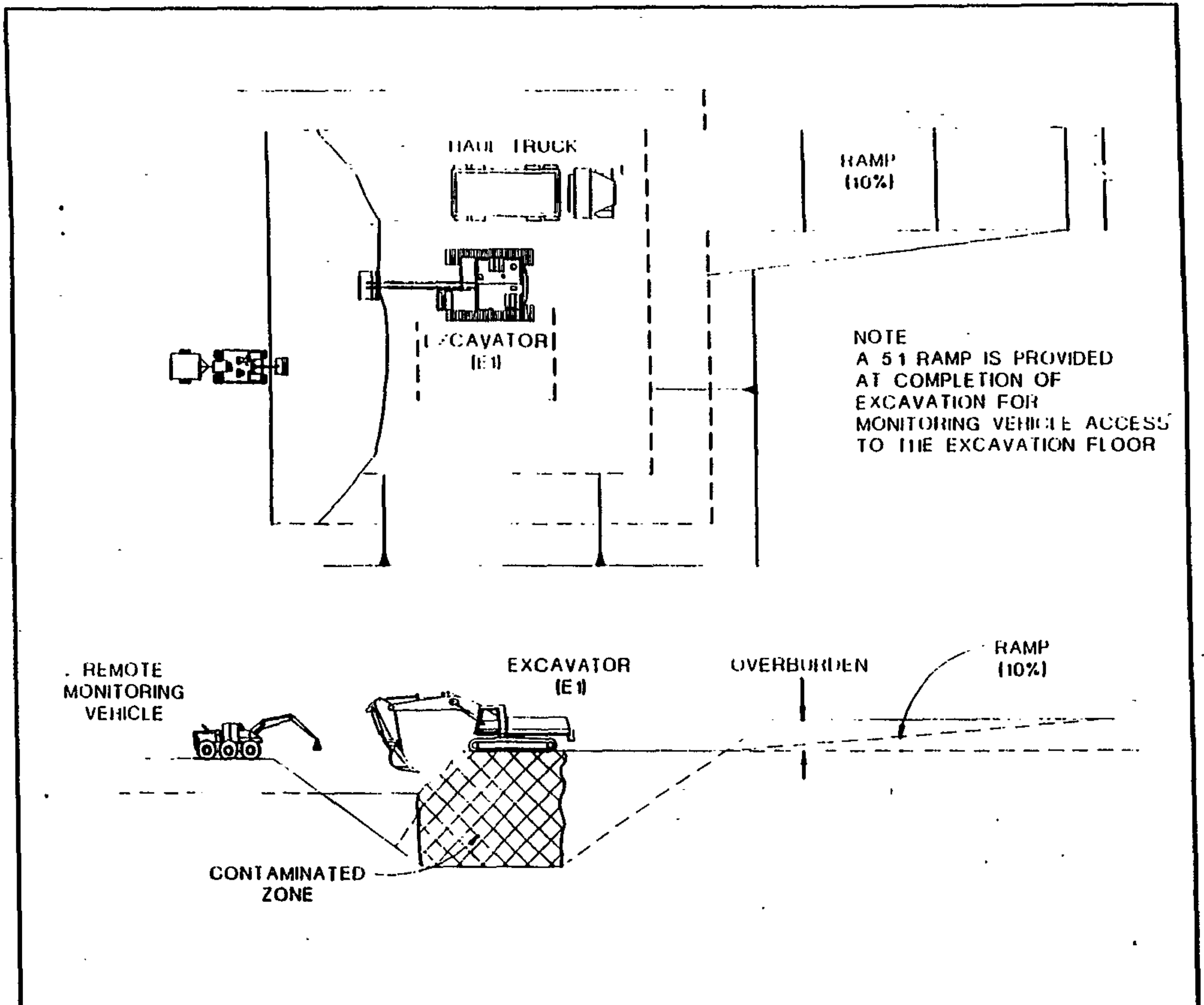
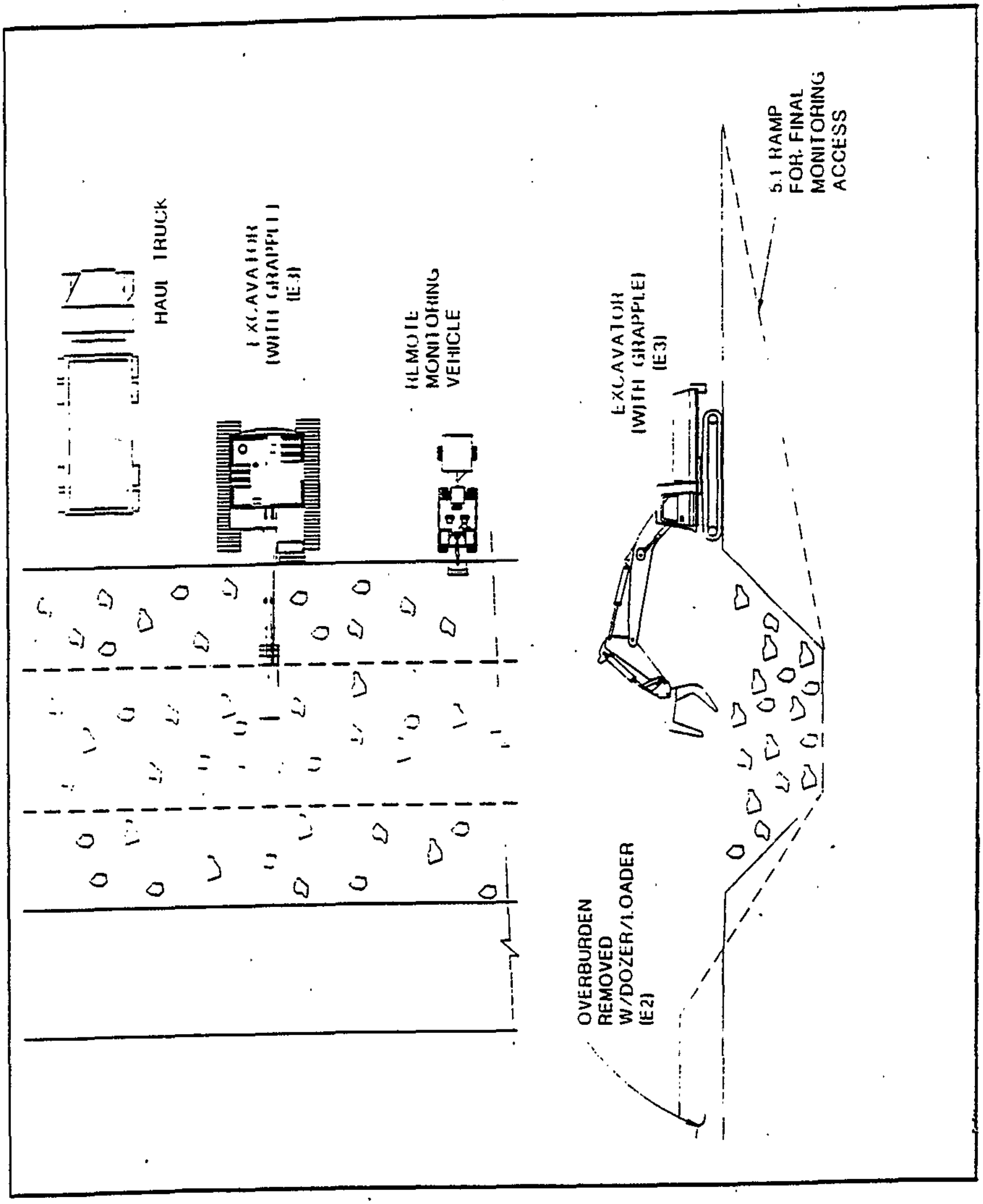
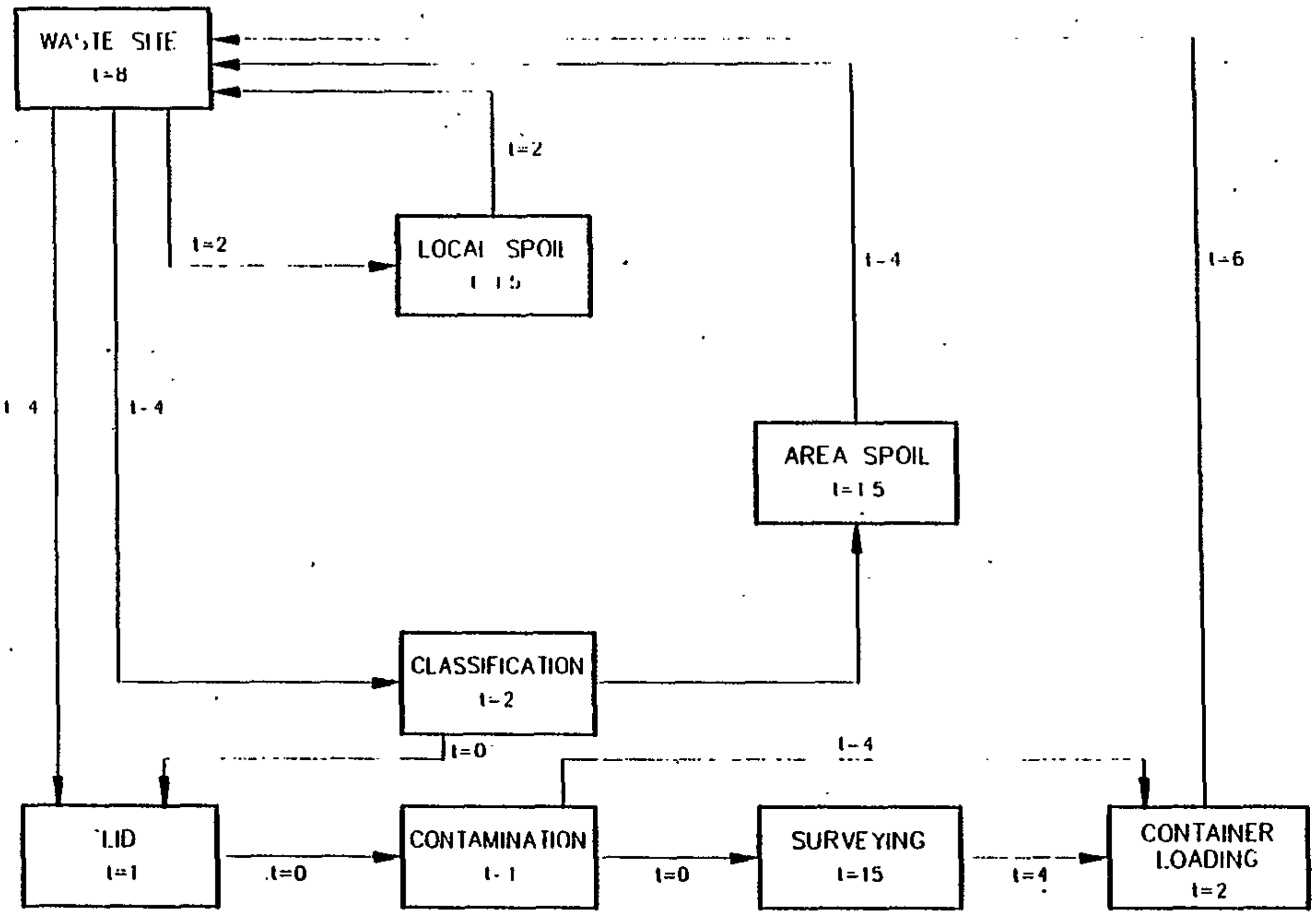


Figure 4-4 Small Site Excavation Approach

Figure 4-5 Buried Waste Excavation Approach

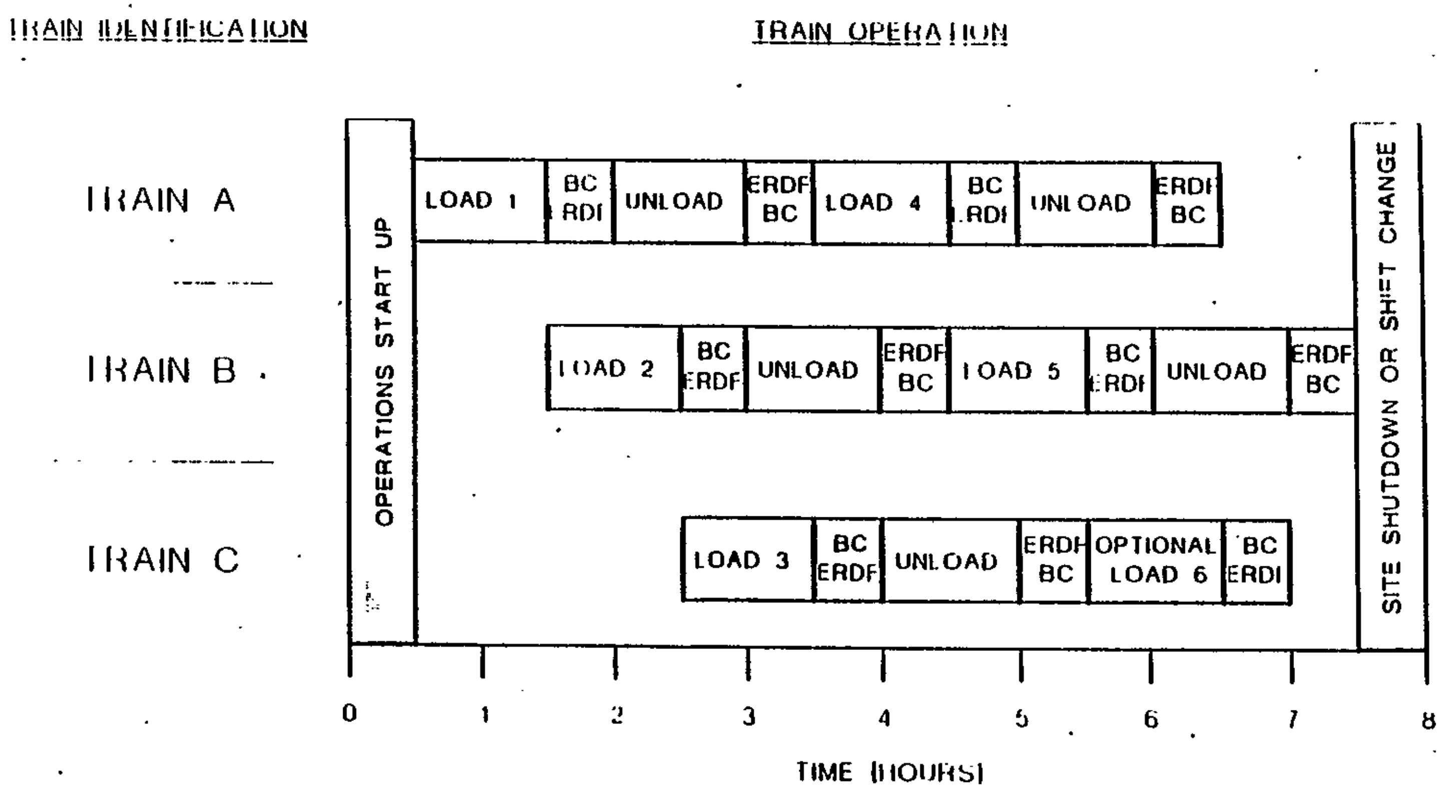




NOTE.
1) ROUNDTRIP TRUCK CYCLE - WASTE SITE TO CONTAINER LOADING = 43 MINUTES.
2) ROUNDTRIP TRUCK CYCLE - WASTE SITE TO AREA SPOIL = 19.5 MINUTES
3) ROUNDTRIP TRUCK CYCLE - WASTE SITE TO LOCAL SPOIL = 13.5 MINUTES

t TIME IN MINUTES

Figure 4-6 Material Handling Cycle Times



LEGEND

BC/ERDF: TRAVEL FROM BC AREA TO DISPOSAL SITE

ERDF/BC TRAVEL FROM THE DISPOSAL SITE TO THE BC AREA

Figure 4-7 Rail Schedule

Table 4-1 Summary of Contaminated Volume (page 1 of 3)

Site Number	Minimum Volume Soil bcy	Minimum Volume Concrete bcy	Minimum Volume Metals bcy	Minimum Volume Soft W. bcy	Minimum Volume TOTAL bcy	Probable Volume Soil bcy	Probable Volume Concrete bcy	Probable Volume Metals bcy	Probable Volume Soft W. bcy	Probable Volume TOTAL bcy	Maximum Volume Soil bcy	Maximum Volume Concrete bcy	Maximum Volume Metals bcy	Maximum Volume Soft W. bcy	Maximum Volume TOTAL bcy
LARGE SITES															
116-B-11	29,443	6,486		104	36,033	370,221	6,486		104	376,811	370,221	6,486		104	376,811
116-C-5	49,887	797	307		50,991	583,821	797	307		584,925	583,821	797	307		584,925
Subtotal	79,331	7,283	307	104	87,025	954,042	7,283	307	104	961,736	954,042	7,283	307	104	961,736
MEDIUM SITES															
116-B-1	2,367				2,367	7,497				7,497	25,204				25,204
116-B-2	139				139	11,241				11,241	36,942				36,942
116-B-13					0					0					0
116-B-14					0					0					0
116-B-15	0				0	0				0	18,996				18,996
116-C-1	43,981				43,981	85,417				85,417	202,708				202,708
116-C-6					0					0	32,284				32,284
PIPELINES	43,411	91	9		43,511	117,088	256	334		117,679	853,147	256	334		853,737
Subtotal	89,898	91	9	0	89,998	221,243	256	334	0	221,834	1,169,280	256	334	0	1,169,871
SMALL SITES															
116-B-3	37				37	56				56	256				256
116-B-4	9				9	12				12	33				33
116-B-6A					0	27				27	363				363
116-B-6B	0				0	15				15	91				91
116-B-9	1				1	4				4	28				28
116-B-10	2				2	3				3	16				16
116-B-12	37				37	56				56	193				193
Subtotal	87	0	0	0	87	172	0	0	0	172	979	0	0	0	979

Table 4-1 Summary of Contaminated Volume (page 2 of 3)

Site Number	Minimum Volume					Probable Volume					Maximum Volume				
	Soil bcy	Concrete bcy	Metals bcy	Soft W. bcy	TOTAL bcy	Soil bcy	Concrete bcy	Metals bcy	Soft W. bcy	TOTAL bcy	Soil bcy	Concrete bcy	Metals bcy	Soft W. bcy	TOTAL bcy
SITES WITH STRUCTURES															
116-B-5	251				251	887				887	7,547				7,547
116-B-7		77			77	70	77			147	350	77			427
116-B-16		9			9	11	9			20	166	9			175
116-C-2A	67	20			87	426	20			446	940	20			960
116-C-2B		7	1		8	12	7	1		20	158	7	1		166
116-C-2C	261	120			381	388	120			508	2,263	120			2,383
116-C-3					0					0			134		134
118-C-4					0		20	0.26		21		20	0.26		21
120-B-1		15			15	21	15			36	257	15			272
126-B-2					0					0		77,549			77,549
126-B-4					0					0	2,045				2,045
132-B-1					0					0	2,105				2,105
132-B-3					0		646			646		646			646
132-B-4					0					0	2,045				2,045
132-B-5					0					0	4,231				4,231
132-B-6		77			77	70	77			147	350	77			427
132-C-1					0		334			334		334			334
132-C-2		154			154	140	154			294	700	154			854
132-C-3					0					0		2,045			2,045
1607-B1	72	27			99	504	27			532	6,856	27			6,883
1607-B3	28				28	194				194	1,621				1,621
1607-B5					0					0	100		0.05		100
1607-B7	7	5			12	48	5			53	513	5			518
1607-B8	10		0.05		10	55		0.05		55	824		0.05		824
1607-B9	71	11			82	376	11			387	5,464	11			5,475
1607-B10	10		0.05		10	55		0.05		55	708		0.05		708
1607-B11	3		0.05		3	15		0.05		15	209		0.05		209
Subtotal	780	523	1	0	1,304	3,273	1,522	1	0	4,797	39,452	81,116	135	0	120,704

Table 4-1 Summary of Contaminated Volume (page 3 of 3)

Site Number	Minimum Volume					Probable Volume					Maximum Volume				
	Soil bcy	Concrete bcy	Metals bcy	Soft W. bcy	TOTAL bcy	Soil bcy	Concrete bcy	Metals bcy	Soft W. bcy	TOTAL bcy	Soil bcy	Concrete bcy	Metals bcy	Soft W. bcy	TOTAL bcy
BURIAL GROUNDS															
118 B-1			21,981	65,942	87,923			21,981	65,942	87,923			21,981	65,942	87,923
118-B-2			262	787	1,049			262	787	1,049			262	787	1,049
118 B-3			20,238	60,713	80,951			20,238	60,713	80,951			20,238	60,713	80,951
118-B-4			94		94			94		94			94		94
118-B-5			3,728		3,728			3,728		3,728			3,728		3,728
118 B 6			38		38			38		38			38		38
118 B 7			21	62	82			21	62	82			21	62	82
118-B-10			503	1,510	2,013			503	1,510	2,013			503	1,510	2,013
118-C-1			15,519	46,556	62,074			15,519	46,556	62,074			15,519	46,556	62,074
118 C-2			5		5			5		5			5		5
126 B-1					0			16,701	50,102	66,802			16,701	50,102	66,802
126-B-3				57,241	57,241				57,241	57,241				57,241	57,241
128-B-1	1,798			2,696	4,494	1,798			2,696	4,494	1,798			2,696	4,494
128-B-2					0				17,506	17,506				17,506	17,506
128-B 3					0	11,180			16,770	27,951	11,180			16,770	27,951
128-C-1					0	13,207		6,603	6,603	26,414	13,207		6,603	6,603	26,414
600-33			0.0041		0.0041			0.0041		0.0041			0.0041		0.0041
600-34					0					0					0
Subtotal	1,798	0	62,389	235,506	299,692	26,185	0	85,693	326,488	438,365	26,185	0	85,693	326,488	438,365
TOTAL	171,893	7,897	62,705	235,610	478,105	1,204,914	9,062	86,335	326,592	1,626,903	2,189,938	88,656	86,469	326,592	2,691,655

Table 4-2 Removal Rates

Excavation Categories	Rate	Based on Estimate of:	Excavating Unit[4]	Notes
Overburden	2,000 LCY/shift	116-B-11	2	Excavation in appropriate lift depths until the contaminated zone is reached. Assumed production rates comparable to a large soil site excavation.
Ramp	2,000 LCY/shift	116-B-11	2	Where necessary, excavation of a ramp proceeds in conjunction with the excavation. Production rates assumed to be comparable to large soil site excavation.
Large Soil Site[1]	2,000 LCY/shift	116-B-11	1 (@ 40%) 2 (@ 60%)	Excavation completed in lifts of 1 foot or less, full depth, to complement in situ monitoring. Factors were applied to the average production rate to compensate for monitoring time during excavation. In addition, contingency was applied to the estimated rate to account for excavation delays.
Medium Soil Site[1,2]	1,800 LCY/shift	116-B-1	1	See notes for large soil sites.
Small Soil Site	1,700 LCY/shift	116-B-12	1	Demolition of structural materials, such as wood and gravel used in crib construction (i.e., does not include buried concrete or metal structures), are considered to have an insignificant effect on the overall production rate. Excavation is from the surface with no ramp (except for individual sites at depths greater than the excavator reach). Factors are applied to the average production rate to compensate for monitoring time during excavation and a contingency is applied to the estimated rate to account for excavation delays and the site size.
Sites with Buried Structures[3]	1,500 LCY/shift	116-C-2C	3	Excavation rates for sites with concrete structures or metal tanks requiring removal, were considered as a whole (i.e., demolition of the structure occurs in conjunction with soil removal due to space restrictions). These sites are generally "small" soil sites. The production rate is adjusted for difficult excavation around buried structures, and a contingency is added for unexpected excavation delays and site size.
Burial Ground Materials	1,000 LCY/shift	118-B-1	3	Solid waste, soil backfill, and soil between the trenches are excavated as one unit from the surface. Demolition or processing of metals and concrete are handled as a separate process. A contingency is added for excavation delays, such as monitoring or health and safety issues.
Concrete	200 LCY/shift	116-B-11	4	Average production rate for demolition of concrete, including cracking and pulverizing, is provided by the manufacturer. A contingency is added for difficult operating conditions.
Metal	100 tons/shift	116-C-5	4 or 5	Average production rate for demolition of metal, including crimping, shearing, and densification, is provided by the manufacturer. A contingency is added for difficult operating conditions.
Demolition Materials Handling	1,500 LCY/shift	116-B-11 and 116-C-5	3	Average production rate for loading of processed metals and concrete based on excavator/grapple rates. Rate adjusted for the difficulty of handling demolished materials.

1. Excludes overburden removal
2. Includes soil from pipeline excavations
3. Basin fill falls in this category
4. See Table 4-4 for definition of excavating units.

Table 4-3 Summary of Excavation Volume and Disposal Volume Estimate (page 1 of 3)

Site Number	EXCAVATION						MATERIALS HANDLING (1)			
	Overburden (LCY)	Basin Fill (LCY)	Contam. Material (LCY)	Other Clean Matl (LCY)	Ramp (LCY)	TOTAL (LCY)	Metal Demo (tons)	Concrete Demo (LCY)	Clean Concrete (LCY)	Soft Waste Processing (LCY)
LARGE SITES										
116-B-11	0	22,101	424,576	76,428	16,995	540,100	0	10,378	0	0
116-C-5	0	25,729	666,481	116,700	20,666	829,576	2,026	1,275	0	0
Excavated Vol Subtotal	0	47,830	1,091,057	193,128	37,661	1,369,675	2,026	11,653	0	0
Disposal Vol Subtotal	0	47,830	1,091,057	0	0	1,138,887				
MEDIUM SITES										
116-B-1	10,920	0	8,847	18,918	7,793	46,477	0	0	0	0
116-B-2	8,427	0	13,265	10,849	9,291	41,831	0	0	0	0
116-B-13	0	0	0	0	0	0	0	0	0	0
116-B-14	0	0	0	0	0	0	0	0	0	0
116-B-15	0	0	0	0	0	0	0	0	0	0
116-C-1	0	0	100,792	47,200	10,943	158,935	0	0	0	0
116-C-6	0	0	0	0	0	0	0	0	0	0
PIPELINES	318,625	0	152,983	236,468	2,877	710,952	2,207	410	0	0
Excavated Vol Subtotal	337,971	0	275,886	313,435	30,903	958,196	2,207	410	0	0
Disposal Vol Subtotal	0	0	275,886	0	0	275,886				
SMALL SITES										
116-B-3	0	0	66	1,203	0	1,268	0	0	0	0
116-B-4	0	0	14	2,387	0	2,401	0	0	0	0
116-B-6A	0	0	31	1,555	0	1,587	0	0	0	0
116-B-6B	0	0	18	1,027	0	1,045	0	0	0	0
116-B-9	0	0	4	102	0	106	0	0	0	0
116-B-10	0	0	4	328	0	331	0	0	0	0
116-B-12	0	0	66	1,819	0	1,884	0	0	0	0
Excavated Vol Subtotal	0	0	203	8,420	0	8,622	0	0	0	0
Disposal Vol Subtotal	0	0	203	0	0	203				

Table 4-3 Summary of Excavation Volume and Disposal Volume Estimate (page 2 of 3)

Site Number	EXCAVATION Overburden (LCY)	Basin Fill (LCY)	Contam. Material (LCY)	Other Clean Matl (LCY)	Ramp (LCY)	TOTAL (LCY)	MATERIALS HANDLING Metal Demo (tons)	Concrete Demo (LCY)	Clean Concrete (LCY)	Soft Waste Processing (LCY)
SITES WITH BURIED STRUCTURES										
116-B-5	0	0	1,047	3,007	0	4,054	0	0	412	0
116-B-7	0	0	206	4,030	0	4,236	0	123	0	0
116-B-16	0	0	28	571	0	599	0	14	0	0
116-C-2A	0	0	535	29,165	0	29,700	0	32	0	0
116-C-2B	0	0	27	6,464	0	6,490	2	11	19	0
116-C-2C	0	0	650	3,728	0	4,378	0	192	0	0
118-C-4	0	0	33	507	0	540	2	33	0	0
116-C-3	0	0	0	0	0	0	0	0	0	0
120-B-1	0	0	49	932	0	981	0	24	0	0
126-B-2	0	0	0	0	0	0	0	0	0	0
126-B-4	0	0	0	0	0	0	0	0	0	0
132-B-1	0	0	0	0	0	0	0	0	0	0
132-B-3	0	0	1,033	14,092	0	15,125	0	1,033	0	0
132-B-4	0	0	0	0	0	0	0	0	0	0
132-B-5	0	0	0	0	0	0	0	0	0	0
132-B-6	0	0	206	4,030	0	4,236	0	123	0	0
132-C-1	0	0	534	7,416	0	7,949	0	534	0	0
132-C-2	0	0	412	5,830	0	6,242	0	246	0	0
132-C-3	0	0	0	0	0	0	0	0	0	0
1607-B1	0	0	627	5,367	0	5,994	0	44	0	0
1607-B3	0	0	228	1,720	0	1,949	0	0	0	0
1607-B5	0	0	0	0	0	0	0	0	0	0
1607-B7	0	0	65	774	0	839	0	8	0	0
1607-B8	0	0	65	300	0	365	0	0	0	0
1607-B9	0	0	461	2,514	0	2,976	0	18	0	0
1607-B10	0	0	65	300	0	365	0	0	0	0
1607-B11	0	0	18	238	0	256	0	0	0	0
Excavated Vol Subtotal	0	0	6,289	90,986	0	97,275	4	2,436	431	0
Disposal Vol Subtotal	0	0	6,289	0	0	6,289				

Table 4-3 Summary of Excavation Volume and Disposal Volume Estimate (page 3 of 3)

Site Number	EXCAVATION						MATERIALS HANDLING			
	Overburden (LCY)	Basin Fill (LCY)	Contam. Material (LCY)	Other Clean Matl. (LCY)	Ramp (LCY)	TOTAL (LCY)	Metal Demo (tons)	Concrete Demo (LCY)	Clean Concrete (LCY)	Soft Waste Processing (LCY)
BURIAL GROUNDS										
118-B-1	63,677	0	114,300	164,417	129	342,523	35,169	0	0	85,725
118-B-2	1,110	0	1,364	270	129	2,872	420	0	0	1,023
118-B-3	24,801	0	105,236	6,046	129	136,211	32,380	0	0	78,927
118-B-4	0	0	123	2,495	0	2,617	151	0	0	0
118-B-5	3,021	0	4,847	1,457	205	9,530	5,965	0	0	0
118-B-6	965	0	49	1,483	129	2,626	60	0	0	0
118-B-7	345	0	107	60	205	717	33	0	0	80
118-B-10	3,793	0	2,617	1,160	556	8,125	805	0	0	1,963
118-C-1	46,111	0	80,696	126,216	129	253,152	24,830	0	0	60,522
118-C-2	0	0	7	40	0	47	8	0	0	0
126-B-1	25,777	0	86,843	0	205	112,826	26,721	0	0	65,132
126-B-3	5,779	0	74,413	56,854	8	137,053	0	0	0	74,413
128-B-1	4,135	0	5,842	510	205	10,693	0	0	0	3,505
128-B-2	11,030	0	22,758	4,778	205	38,771	0	0	0	22,758
128-B-3	14,422	0	36,336	5,040	205	56,004	0	0	0	21,801
128-C-1	12,308	0	34,338	3,642	205	50,493	10,565	0	0	8,584
600-33	871	0	0	6	1,885	2,762	0	0	0	0
600-34	0	0	0	0	0	2,762	0	0	0	0
Excavated Vol Subtotal	218,145	0	569,874	374,472	4,530	1,167,021	137,108	0	0	424,434
Disposal Vol Subtotal	0	0	569,874	0	0	569,874				
EXCAVATED VOLUME TOTAL	556,116	47,830	1,943,308	980,441	73,094	3,600,789	141,345	14,499	431	424,434
DISPOSAL VOLUME TOTAL	0	47,830	1,943,308	-0	0	1,991,139				

DISPOSAL VOLUME BY MATERIAL TYPE

MATERIAL TYPE:	Soil	Soft Waste	Concrete	Metals	TOTAL
UNITS:	(LCY)	(LCY)	(LCY)	(LCY)	(LCY)
VOLUME:	1,410,860	424,434	14,499	141,345	1,991,139

NOTES:

(1) Materials Handling Volumes are included in the Excavation Volume.
Concrete and Metals Volumes, provided separately, are utilized to estimate Demolition/Processing Duration.

Table 4-4 Quantity of Excavating Units

EXCAVATING UNIT NO.	EQUIPMENT DESCRIPTION	TOTAL SHIFTS (2)	QUANTITY OF UNITS (3)
1	Excavator (150,000 lb) with 5 - 6 cy Bucket	596.8	0.4
2	Bulldozer (750 HP) with SU Blade Wheel Loader (375HP) with 7 cy Bucket	691.5	0.5
3	Excavator (150,000) with Grapple attachment Grapple sleeve or 5 - 6 cy Bucket option for soil	1229.5	0.8
4	Excavator with interchangeable processing/demolition attachments and hydraulic hammer, as necessary	1445.8	1.0
5	Excavator (200,000 lb.) with Mobile Shear and Densifier attachments	42.3	0.03

NOTES:

(1) Quantity of Excavating Units is based upon projected equipment utilization requirements. Equipment availability requirements and the associated duration adjustments will be considered in the site sequencing.

(2) Formulas for Total Shifts - Equipment Usage

E1: (Small Sites: Excavation Subtotal) + (Medium Sites: Contaminated Material + Other Clean Material) + (Large Sites: (Excavation Subtotal -Basin Fill)0.40)

E2: (Medium Sites: Overburden + Ramp) + (Large Sites: (Excavation Subtotal - Basin Fill)0.60) + (Burial Grounds: Overburden + Ramp)

E3: (Sites with Buried Structures: Excavation Subtotal + Metals Loading + Concrete Loading) + (Medium Sites: Metal Loading + Concrete Loading + Pipeline Removal) + (Large Sites: Metal Loading + Concrete Loading + Basin Fill) + (Burial Grounds: Excavation Subtotal - Overburden - Ramp + Metal Loading + Concrete Loading)

E4: (Concrete Demolition: Total) + (Metal Demolition: Total - Site 116-C-5 - Effluent Pipelines)

E5: (Metal Demolition: Site 116-C-5 + Effluent Pipelines)

(3) The quantity of units is based on 1800 shifts total project time, see Section 4.4.4

Table 4-5 Summary of Excavation Duration (page 1 of 3)

Site Number	EXCAVATION Overburden (shifts)	Basin Fill (shifts)	Contam. Material (shifts)	Other Clean Matl. (shifts)	Ramp (shifts)	Subtotal (shifts)	MATERIALS HANDLING Metal Demo (shifts)	Metal Loading (shifts)	Concrete Demo (shifts)	Concrete Loading (shifts)	Pipeline Removal (shifts)	Subtotal (shifts)	TOTAL (shifts)
LARGE SITES													
116-B-11	0.00	14.73	212.29	38.21	8.50	273.73	0.00	0.00	51.89	6.92		58.81	332.54
116-C-5	0.00	17.15	333.24	58.35	10.33	419.08	20.26	2.25	6.38	0.85		29.74	448.82
Subtotal	0.00	31.89	545.53	96.56	18.83	692.81	20.26	2.25	58.26	7.77	0.00	88.55	781.36
MEDIUM SITES													
116-B-1	5.46	0.00	4.91	10.51	3.90	24.78	0.00	0.00	0.00	0.00		0.00	24.78
116-B-2	4.21	0.00	7.37	6.03	4.65	22.26	0.00	0.00	0.00	0.00		0.00	22.26
116-B-13	0.00	0.00	0.00	0.00	0.00	0.00						0.00	0.00
116-B-14	0.00	0.00	0.00	0.00	0.00	0.00						0.00	0.00
116-B-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
116-C-1	0.00	0.00	56.00	26.22	5.47	87.69	0.00	0.00	0.00	0.00		0.00	87.69
116-C-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
PIPELINES	159.31	0.00	84.99	131.37	1.44	377.11	22.07	2.45	2.05	0.27	21.43	48.28	425.39
Subtotal	168.99	0.00	153.27	174.13	15.45	511.84	22.07	2.45	2.05	0.27	21.43	48.28	560.12
SMALL SITES													
116-B-3	0.00	0.00	0.04	0.71	0.00	0.75	0.00	0.00	0.00	0.00		0.00	0.75
116-B-4	0.00	0.00	0.01	1.40	0.00	1.41	0.00	0.00	0.00	0.00		0.00	1.41
116-B-6A	0.00	0.00	0.02	0.91	0.00	0.93	0.00	0.00	0.00	0.00		0.00	0.93
116-B-6B	0.00	0.00	0.01	0.60	0.00	0.61	0.00	0.00	0.00	0.00		0.00	0.61
116-B-9	0.00	0.00	0.00	0.06	0.00	0.06	0.00	0.00	0.00	0.00		0.00	0.06
116-B-10	0.00	0.00	0.00	0.19	0.00	0.19	0.00	0.00	0.00	0.00		0.00	0.19
116-B-12	0.00	0.00	0.04	1.07	0.00	1.11	0.00	0.00	0.00	0.00		0.00	1.11
Subtotal	0.00	0.00	0.12	4.95	0.00	5.07	0.00	0.00	0.00	0.00	0.00	0.00	5.07

Table 4-5 Summary of Excavation Duration (page 2 of 3)

Site Number	EXCAVATION Overburden (shifts)	Basin Fill (shifts)	Contam. Material (shifts)	Other Clean Matl. (shifts)	Ramp (shifts)	Subtotal (shifts)	MATERIALS HANDLING Metal Demo (shifts)	Metal Loading (shifts)	Concrete Demo (shifts)	Concrete Loading (shifts)	Pipeline Removal (shifts)	Subtotal (shifts)	TOTAL (shifts)
SITES WITH BURIED STRUCTURES													
116-B-5	0.00	0.00	0.70	2.00	0.00	2.70	0.00	0.00	2.06	0.27		2.33	5.04
116-B-7	0.00	0.00	0.14	2.69	0.00	2.82	0.00	0.00	0.62	0.08		0.70	3.52
116-B-16	0.00	0.00	0.02	0.38	0.00	0.40	0.00	0.00	0.07	0.01		0.08	0.48
116-C-2A	0.00	0.00	0.36	19.44	0.00	19.80	0.00	0.00	0.16	0.02		0.18	19.98
116-C-2B	0.00	0.00	0.02	4.31	0.00	4.33	0.02	0.00	0.15	0.02		0.19	4.52
116-C-2C	0.00	0.00	0.43	2.49	0.00	2.92	0.00	0.00	0.96	0.13		1.09	4.01
116-C-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
118-C-4	0.00	0.00	0.02	0.34	0.00	0.36	0.00	0.00	0.16	0.02		0.19	0.55
120-B-1	0.00	0.00	0.03	0.62	0.00	0.65	0.00	0.00	0.12	0.02		0.14	0.79
126-B-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
126-B-4						0.00						0.00	0.00
132-B-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
132-B-3	0.00	0.00	0.69	9.39	0.00	10.08	0.00	0.00	5.17	0.69		5.85	15.94
132-B-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
132-B-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
132-B-6	0.00	0.00	0.14	2.69	0.00	2.82	0.00	0.00	0.62	0.08		0.70	3.52
132-C-1	0.00	0.00	0.36	4.94	0.00	5.30	0.00	0.00	2.67	0.36		3.02	8.32
132-C-2	0.00	0.00	0.27	3.89	0.00	4.16	0.00	0.00	1.23	0.16		1.40	5.56
132-C-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
1607-B1	0.00	0.00	0.42	3.58	0.00	4.00	0.00	0.00	0.22	0.03		0.25	4.24
1607-B3	0.00	0.00	0.15	1.15	0.00	1.30	0.00	0.00	0.00	0.00		0.00	1.30
1607-B5						0.00						0.00	0.00
1607-B7	0.00	0.00	0.04	0.52	0.00	0.56	0.00	0.00	0.04	0.01		0.05	0.61
1607-B8	0.00	0.00	0.04	0.20	0.00	0.24	0.00	0.00	0.00	0.00		0.00	0.25
1607-B9	0.00	0.00	0.31	1.68	0.00	1.98	0.00	0.00	0.09	0.01		0.10	2.09
1607-B10	0.00	0.00	0.04	0.20	0.00	0.24	0.00	0.00	0.00	0.00		0.00	0.25
1607-B11	0.00	0.00	0.01	0.16	0.00	0.17	0.00	0.00	0.00	0.00		0.00	0.17
Subtotal	0.00	0.00	4.19	60.66	0.00	64.85	0.03	0.00	14.33	1.91		16.28	81.13

Table 4-5 Summary of Excavation Duration (page 3 of 3)

TABLE 4-5
SUMMARY OF EXCAVATION DURATION

Site Number	EXCAVATION Overburden (shifts)	Basin Fill (shifts)	Contam. Material (shifts)	Other Clean Matl. (shifts)	Ramp (shifts)	Subtotal (shifts)	MATERIALS HANDLING Metal Demo (shifts)	Metal Loading (shifts)	Concrete Demo (shifts)	Concrete Loading (shifts)	Pipeline Removal (shifts)	Subtotal (shifts)	TOTAL (shifts)
BURIAL GROUNDS													
118-B-1	31.84	0.00	114.30	164.42	0.06	310.62	351.69	39.08	0.00	0.00		390.77	701.39
118-B-2	0.55	0.00	1.36	0.27	0.06	2.25	4.20	0.47	0.00	0.00		4.66	6.92
118-B-3	12.40	0.00	105.24	6.05	0.06	123.75	323.80	35.98	0.00	0.00		359.78	483.53
118-B-4	0.00	0.00	0.12	2.49	0.00	2.62	1.51	0.17	0.00	0.00		1.68	4.29
118-B-5	1.51	0.00	4.85	1.46	0.10	7.92	59.65	6.63	0.00	0.00		66.28	74.20
118-B-6	0.48	0.00	0.05	1.48	0.06		0.60	0.07	0.00	0.00		0.67	2.75
118-B-7	0.17	0.00	0.11	0.06	0.10	0.44	0.33	0.04	0.00	0.00		0.37	0.81
118-B-10	1.90	0.00	2.62	1.16	0.28	5.95	8.05	0.89	0.00	0.00		8.95	14.90
118-C-1	23.06	0.00	80.70	126.22	0.06	230.03	248.30	27.59	0.00	0.00		275.88	505.92
118-C-2	0.00	0.00	0.01	0.04	0.00	0.05	0.08	0.01	0.00	0.00		0.09	0.14
126-B-1	12.89	0.00	86.84	0.00	0.10	99.83	267.21	29.69	0.00	0.00		296.90	396.73
126-B-3	2.89	0.00	74.41	56.85	0.00	134.16	0.00	0.00	0.00	0.00		0.00	134.16
128-B-1	2.07	0.00	5.84	0.51	0.10	8.52	0.00	0.00	0.00	0.00		0.00	8.52
128-B-2	5.51	0.00	22.76	4.78	0.10	33.15	0.00	0.00	0.00	0.00		0.00	33.15
128-B-3	7.21	0.00	36.34	5.04	0.10	48.69	0.00	0.00	0.00	0.00		0.00	48.69
128-C-1	6.15	0.00	34.34	3.64	0.10	44.24	105.65	11.74	0.00	0.00		117.39	161.63
600-33	0.44	0.00	0.00	0.01	0.94	1.38	0.00	0.00	0.00	0.00		0.00	1.38
600-34						0.00						0.00	0.00
Subtotal	109.07	0.00	569.87	374.47	2.26	1,055.68	1,371.08	152.34	0.00	0.00	0.00	1,523.42	2,579.11
TOTAL	278.06	31.89	1,272.98	710.78	36.55	2,330.25	1,413.44	157.05	74.65	9.95	21.43	1,676.53	4,006.78

5.0 SITE RECLAMATION AND CLOSURE

The final steps in the 100 B/C remediation involve the closure of each waste site, reclamation of the excavated areas, and removal of all the ancillary facilities. These steps are discussed in detail in the following sections.

5.1 WASTE SITE CLOSURE

Site closure requirements have not been specifically defined for the 100 B/C Area. The closure process requires that analyses of soil samples from a waste site indicate that contaminant levels are below regulatory requirements. The analytical plan (WHC 1993d) identifies sampling and analytical procedures, goals, and requirements. Section 6.1.5 summarizes the site closure monitoring and analysis for the 100 B/C waste sites.

The optimal closure process allows individual areas to be backfilled soon after the excavation process is complete to avoid excavations remaining open for long periods of time. It is estimated that six months will be required for closure certification initially and three months in the later years of operation.

5.2 SITE RECLAMATION

Site reclamation is the process of backfilling the excavations, restoring a natural grade to the area, and revegetating the disturbed land. The following sections discuss the strategies for backfilling operations, the quantities and types of materials to be moved, and the time and equipment which will be required.

5.2.1 Backfilling and Final Grading

The final grade for the site is shown in Drawing H-1-80238. Because contaminated material is being transported out of the 100 B/C Area, the quantity of stockpiled clean spoils is not sufficient to restore the site to original grade. Assuming that no material is to be imported to the area, reclamation proceeds using the available materials supplemented by significant additional regrading earthwork. The overall objective for final grading is to produce contours which closely follow the original topography or match topographic features typical of the geographic setting.

5.2.1.1 Backfill Strategy. For the purposes of reclamation planning, excavation volumes were recalculated using a computer-aided-design software which estimates volumes from excavation contour data plotted electronically on maps. Three digital terrain models exist for the site: the original topography, the planned excavation topography, and the final grade. This calculation of excavated volumes is considered to be more accurate than the manual estimates discussed in Section 4.3.4 and Table 4-4. The total excavated volume calculated by this software program is about 4.2 million LCY, of which 2.0 million LCY is contaminated material to be shipped to ERDF and the remaining 2.2 million LCY is uncontaminated material to be stockpiled on-site for use as backfill.

The terrain model for the final grade was produced such that the stockpiled material is returned to the excavation and the fill deficit made up by cut volume in areas to be regraded. The final grading requires 3.2 million LCY of backfill material; 2.2 million is obtained from the stockpiled material. The deficit of 1.0 million LCY is obtained from additional cut material derived during regrading.

Two reclamation strategies are followed to obtain the final grade:

- Strategy 1 - Backfill is obtained mostly from the local stockpiled material with a minimum amount of material obtained from cut areas during regrading.

- Strategy 2 - Backfill is obtained from both stockpiled material and significant additional material cut from around the area during regrading.

The 100 B/C Area is divided into thirteen reclamation areas, each employing one of the two reclamation strategies. The reclamation areas are shown on Drawing H-1-80248. Strategy 1 is employed in reclamation areas 2, 3, 4, 5, 6, and 7. These are generally areas around the reactor buildings where stockpiled material is sufficient to restore the areas to original grade. Strategy 2 is employed in reclamation areas 1, 8, 9, 10, 11, 12, and 13. These areas consist of the retention basin area and burial ground areas where stockpiled material is not sufficient to completely backfill the excavations. In the retention basin area (reclamation area 1), an additional 650,000 BCY of material is cut from around the excavated areas to both backfill the excavation void and reduce terrain undulations.

5.2.1.2 Equipment. Backfilling is accomplished by bulldozing the clean material from local storage piles or using a wheeled loader and truck combination to haul clean material from local and central stockpiles. The additional earthwork for regrading is accomplished with scrapers. Material is placed in lifts and compacted with a tamping foot soil compactor to minimize potential subsidence. The target density and moisture content should be near that of the surrounding undisturbed material.

Reclamation equipment is comparable to excavation equipment to allow sharing of equipment, if necessary. Excavation equipment which is idle may also be used in reclamation to increase productivity. Scrapers and compactors may have their sole use during reclamation activities; such equipment may be used during road and facility area improvement. Trucks used for excavation are also used for reclamation to maximize utilization and minimize idle equipment.

5.2.1.3 Operational Strategy. The strategy for reclamation operations is based on the following:

- Backfill from all local stockpiles is accomplished as soon as all sites sharing a common access road achieve closure. This limits the movement of backfill material over potentially contaminated haul roads still being used for excavation operations.

- Backfill operations employ one bulldozing crew and one wheel loader and truck crew. These two crews can operate simultaneously at different waste sites.

- Cut and fill recontouring employs one crew and may occur as soon as reasonably achievable in areas not interfering with excavation.

- The productivity of the soil compactor does not limit the rate of reclamation operations.

- Haul of material from the central storage pile is accomplished at the end of all excavation, during the last six months of the project. This avoids transport of clean material over potentially contaminated roadways.

- Excavation downtime due to weather delays may be used for backfill operations because backfilling only handles clean soil.

- Whenever excavation crews are available, they can be utilized in the backfill operations.

Specific backfill operations are described in the following paragraphs.

Bulldozer Backfill Operations

Local stockpiles within 120 m of an area to be backfilled are moved by bulldozer. One bulldozer pushes material to the excavation while a soil compactor equipped with a blade spreads and compacts the material in approximately one foot lifts. Production rates for the dozer backfill operations vary from site to site and are dependent upon dozing distance. There is a total of approximately 50 shifts of dozing backfill operations for the project. Bulldozer operations begin in FY 1998 and continue through FY 2001.

Wheeled Loader and Truck Backfill Operations

Local stockpiles greater than 120 m from the area to be backfilled as well as material from the central storage pile are moved by a wheeled loader and truck operation. One loader is used to fill containers on haul trucks. The number of haul trucks is sufficient to keep the wheel loader running constantly; the wheel loader production rate is the limiting factor in the operation.

The trucks haul the soil to the waste site, dump, and then return. At the waste site, a compactor equipped with a blade spreads and compacts the backfill in approximately one foot lifts. A total of approximately 695 shifts are necessary to complete the wheel loader and truck backfill operations from the local storage piles. Local backhaul begins in FY 1998 and continues through FY 2001. The haul from the central storage pile requires approximately 77 shifts during FY 2001.

Scraper and Bulldozer Regrading Operations

Wheel scrapers and bulldozers are employed for the regrading and cut and fill operations. Bulldozers are employed when regrading distance is less than 120 m. Wheel scrapers are used when distances exceed 120 m. The bulldozers normally used in spoil pile maintenance and in backfill and excavation operations are used for regrading when available. Two wheel scrapers are employed in FY 2000 and operate through FY 2001. The scrapers are used in the push-pull fashion so they can assist each other in loading.

A total of approximately 187 shifts are required for the dozer and the scraper operations combined.

Reclamation activity durations are summarized as follows:

Reclamation Activity	Duration Shifts
Bulldoze backfill from local piles	50
Haul backfill from local piles	695
Haul backfill from central pile	77
Recontour	187
TOTAL	1,009

As an option to recontouring, soil can be backhauled from the ERDF. About 1 million LCY would be required. One option for transport of the material is to fill the shipping containers with clean soil at ERDF for transport on their return trip to the 100 B/C Area. Other options would include use of dedicated trucks to haul material. Although a definitive evaluation has not been performed, the baseline design which includes recontouring is judged to be the most cost effective. Additional evaluations should be performed as part of the definitive design to verify or refute this conclusion.

5.2.2 Revegetation

The final stage in site reclamation is revegetation. The purpose of revegetation is to stabilize the surfaces disturbed by remediation. The revegetation requires seeding and limited irrigation to promote the growth of the vegetation. The revegetation occurs at a waste site as soon as the final grading is accomplished in the area.

The revegetation procedure proposed for this pre-design is adapted from an established procedure currently used on the Hanford Site by the D&D program (Procedure DD-170-007, "Revegetation of Outdoor Sites"). The procedure is briefly summarized as follows:

- to prepare the soil, it is loosened by plow or disk, if necessary
- a fertilizer is applied to the area to be revegetated
- a seed drill is used to place a seed mixture of desired grasses
- the soil is irrigated as necessary
- a mulch is applied consisting of excelsior blanket or chemical fixant to prevent emissions of fugitive dust from the disturbed areas.

A revegetation checklist is completed prior to revegetation to document items such as the date of proposed planting and required materials and equipment. At the completion of the revegetation a revegetation data sheet is filled out which documents the actual date of revegetation, location, and type of seed used. Ongoing maintenance may be required as dictated by site conditions. Maintenance may include additional irrigation and application of herbicides.

5.3 PROJECT CLOSEOUT

Project closeout begins after all waste sites are certified clean, all waste has been transported to ERDF and all backfill operations are complete. Project closeout includes the demobilization and dismantling of the infrastructure at the 100 B/C area. The temporary structures, equipment, and materials are surveyed, decontaminated, and relocated to an area convenient for transport to future projects. Project closeout activities are described below in order of occurrence.

- All areas east of the container survey station (i.e., container transfer area) are surveyed and decontaminated as necessary.
- All confirmatory samples are sent to the mobile lab for analysis.
- At the time the area is considered free of contamination, the area is used for equipment and material staging, prior to shipment to a future project.
- With a clean staging area available, all vehicles and equipment are surveyed for contamination.

- The clean and contaminated vehicles and equipment are segregated. The contaminated equipment is sent through the equipment decontamination station and then surveyed at the container survey station. All clean vehicles and equipment are sent directly to the container transfer area for staging.

- Once the original equipment staging area is free of vehicles and equipment, the area is surveyed and decontaminated as necessary. Any confirmatory samples are sent to the mobile lab for analysis.

- The roadway from the equipment staging area to the equipment decontamination station is surveyed and decontaminated as necessary.

- The personnel decontamination station on the west side of the site is relocated to the east side of the site for use during the project closeout.

- Temporary structures are dismantled and surveyed for contamination. In a manner similar to the equipment, the structures are segregated and decontaminated as necessary. All structural components are then staged in the container transfer area.

- The waste classification structure is dismantled first, then the equipment decontamination station, the container survey station and finally the mobile laboratory buildings.

- As part of the temporary structure removal, all utilities are disconnected, all above ground systems are removed, and all sanitary waste and refuse is removed for appropriate disposal.

- All trailers are staged in the office area to await relocation.

- At this stage, all of the vehicles, equipment and materials are located in the container transfer area. They are now available for shipping by train to the next project. The mobile trailers can be hauled by truck.

- The site is now clear of remediation infrastructure and materials. Areas disturbed by closeout are now graded and revegetated.

6.0 ANCILLARY SYSTEMS AND FACILITIES

This section describes the preliminary design of ancillary systems and facilities as follows:

- analytical system including the material classification structure
- roadway and rail transport systems including trucks and containers
- decontamination facility
- maintenance systems
- storage requirements and areas
- dust control systems
- support systems and facilities including offices, on-site labs, and off-BC-site services
- areas of interface including interdependencies among systems.

6.1 ANALYTICAL SYSTEM

The analytical system as applied to remediation of the 100 B/C Area consists of the following elements:

- site contamination conceptual model
- pre-excavation monitoring and analysis
- excavation monitoring and analysis
- container monitoring and analysis
- final site closure monitoring and analysis.

Each of these elements is described in the subsections below. The overall logic of the analytical system is depicted in the flow sheet provided in Drawing H-1-80219. Details of the analytical plan are described separately in the analytical system plan which is being issued as a companion document to this preliminary design report (WHC 1993d).

6.1.1 Site Contamination Conceptual Model

The site contamination conceptual model provides a site-specific model of the nature and extent of contamination within a waste site based upon process knowledge and prior characterization data. Using these data, the initial estimates of waste volumes and classes are made and the excavation strategy is developed.

The model is continuously refined based upon data collected from both pre-excavation and excavation monitoring. Sites excavated later in the schedule have the added benefit in that data are available from earlier excavations which may be used to modify the conceptual model of all sites in the area.

6.1.2 Pre-Excavation Monitoring and Analysis

The location of the site must be known with some degree of certainty to begin excavation. The level of confidence among sites in the 100 B/C Area is highly variable (see Section 3.1.3). Some sites will, therefore, require pre-excavation monitoring to locate the site adequately.

The site location system uses non-intrusive sensing techniques to define the location of wastes sites whose locations are not known with sufficient accuracy to initiate excavation. Non-intrusive sensing consists of the following:

- Large area scans performed by aircraft equipped with infrared thermography (IRT), magnetometry, or conductivity instrumentation to identify disturbed areas. Use of the large area scans allows the location to be narrowed to smaller suspect areas.

- Detailed scans with ground penetrating radar (GPR) instrumentation to further refine site boundaries.

If the non-intrusive techniques fail to adequately locate the waste site, overburden gridding is applied. Overburden gridding consists of digging trenches in the overburden using the excavator. These trenches are dug in a parallel and criss-cross (grid) patterns over the suspect area. As overburden is removed in each trench, the trench bottom is simultaneously monitored using the in situ monitoring system (described in the paragraphs below). The gridding process is continued until the site boundaries are sufficiently identified to begin excavating the contaminated material. Boundaries are marked to guide excavation operations.

6.1.3 Excavation Monitoring and Analysis

Once the boundaries of the waste site are located and staked, excavation operations are initiated. The excavation monitoring system is used to identify the contaminant boundaries and to refine the determination of waste classes established in the site model.

After the site is located, the excavation monitoring system is used to measure the contaminant levels on the surface to ensure that contamination is not present on the surface. The excavation monitoring detectors are platform mounted and can either be operated from all-terrain vehicles which travel over the excavated surfaces or operated from hydraulic booms for access in areas where the all-terrain vehicle cannot travel.

After the initial monitoring, clean overburden, if any, is removed. The excavation monitoring system is used in tandem with the excavation equipment to monitor each successive one foot lift. Boundaries between different waste classes and between the clean and contaminated areas (fringe area) are identified and marked by staking. Excavation equipment operators use the marked boundaries to segregate the materials into appropriate waste classes. Parallel monitoring of the air and soil moisture monitoring are conducted separately. All monitoring and sampling activities are conducted such that excavation operations are not impeded.

The monitoring grid used for excavation monitoring is designed to allow more precise delineation of the clean/contaminated material boundary and to minimize the possibility of designating (misidentifying) clean material as contaminated.

The excavation monitoring system consists of on-line field monitoring instrumentation coupled with near-real time (i.e., less than two hour turnaround time) on-site laboratory analyses. The following on-line monitoring components have been considered:

- gamma spectrometry using a sodium iodide (NaI) detector array with MCA for radionuclide detection
- photo-ionization (PID) or flame-ionization (FID) detectors for volatile organic compound detection
- field XRF for metals
- soil moisture using a neutron densimeter
- total and respirable dust and radionuclides using hi-vol samplers
- air organic concentration using field gas chromatography/mass spectroscopy (GC/MS).

Gamma spectrometry serves as the primary in situ screening technique to determine presence of contamination.

Should excavation monitoring or the site conceptual model indicate that contamination is above regulatory levels, then grab samples of the material are taken to the on-site laboratory for quantification. Quality Assurance grab samples are also taken at the necessary intervals and are analyzed for all COCs for the site.

Field analysis is performed in the on-site laboratory located at the 100 B/C Site (see Drawing H-1-80224). The on-site laboratory consists of trailers grouped together to provide the necessary analytical support. The on-site laboratory is also designed to provide contract laboratory procedure (CLP) equivalent analyses, thus allowing site closure samples to be analyzed in the on-site laboratory.

On-site laboratory analytical methods and operating procedures are designed to achieve two levels of sample turnaround: near-real-time sample turnaround, i.e., two hours or less for analyses needed to guide excavation and classification operations and longer turnaround times (24 hours or greater) for QA and site closure samples.

6.1.4 Container Monitoring and Analysis

The excavation monitoring system is capable of identifying the approximate contamination boundaries within a waste site as excavation proceeds. However, to minimize the amount of clean material misidentified as contaminated, all material within about 5 ft (on either side) of the contamination boundary (referred to as the fringe area) is subjected to additional monitoring at the container monitoring station. The container monitoring station employs the same contaminant detection methods as the in situ system except that for radionuclide detection, a germanium detector is used instead of NaI to provide higher resolution.

The container monitoring station provides a structure supporting an array of stationary detectors which monitor the container contents as the truck is driven through the station. Conceptual design of this structure is shown on Drawing H-1-80231. The truck with its open top container enters the station and stops at a pre-determined location. The detector array moves into position at a pre-determined distance from the container contents, the contents are counted for a specified time period, and the data are recorded in the data acquisition system.

At the same time the container contents are being counted with the detectors, a grab sample is taken. Grab samples are necessary for QA analysis and for fringe material which potentially contains organic contaminants. The grab sample is sent to the on-site laboratory for analysis and the results are recorded in the data acquisition system.

Container contents are classified by material type as follows:

- clean material (soil or debris)
- contact-handled low level radioactive waste
- remote-handled low level radioactive waste
- contact-handled mixed hazardous/radioactive waste
- remote-handled mixed hazardous/radioactive waste
- hazardous-only waste
- TRU waste.

Container contents are classified based on the following information:

- prior knowledge from operating records (process knowledge) and from prior characterization sampling and analysis

- excavation monitoring and field analysis results

- container monitoring results
- combinations of the above.

Material types are determined by the following methods:

- radioactive components
  - prior knowledge
  - in situ monitoring instrumentation
  - container monitoring information if material is from fringe areas (or 10% of containers from known contaminated areas)
  - confirmation QA of monitoring results with grab samples
- chemical (hazardous) components
  - prior knowledge (chromium in liquid waste sites, metals in burial grounds)
  - in situ screening instrumentation (XRF for metals, PID/FID for volatile organics)
  - on-site lab analysis (where prior knowledge indicates potential for chemical contamination exceeding limits)
  - container monitoring information if material is from fringe areas (or
  - 10% of containers from known contaminated areas)
  - confirmation QA of monitoring results with grab samples
- remote- or contact-handled
  - prior knowledge (buried waste is the only potential remote-handled material)
  - in situ monitoring instrumentation
  - container surface radiation scan
- TRU components
  - prior knowledge
  - on-site lab analysis of suspect TRU material (alpha detection methodology).

Based on the material classification information, containers are routed as follows:

- to the container transfer station to be loaded directly on rail cars and shipped to the disposal site
- to the container transfer station in the interim storage area awaiting on-site lab results (applies only to those containers for which laboratory analysis is required to classify the waste)

- directly to the central clean material stockpile.

Upon receipt of on-site lab analysis, containers in interim storage are either loaded on railcars or backhauled to the clean stockpile.

6.1.5 Site Closure Monitoring and Analysis

After excavation monitoring and field analysis indicate that all regulated material has been removed from the waste site, the site closure monitoring is performed. Closure monitoring is similar to the excavation monitoring methods employed during excavation except that:

- Germanium detectors and longer counting times are used to lower detection limits and improve accuracy.
- The in situ measurements are obtained over a dense sampling grid to ensure that the site meets the closure criteria.
- Grab samples are obtained for laboratory analyses to confirm contaminant levels. The number of grab samples is sufficient to provide a 95% confidence that the cleanup levels have been achieved.

The on-site laboratory analysis consists of identification and quantification of all site COC. These analyses are performed to meet CLP equivalency to ensure that an accurate and defensible record of site conditions is obtained.

If closure monitoring and analysis indicate that cleanup levels have not been achieved, additional excavation is conducted to remove the remaining contamination, if such removal is possible. If not possible, then further action is deferred pending additional evaluation and consultation with the regulatory agencies.

6.2 TRANSPORT

Transport systems include containers, trucks which haul containers to the container transfer area or to the clean stockpile, and roadway and rail systems which are used to haul containers to the disposal site. Specific design analysis of these systems is described in the subsections below.

6.2.1 Containers and Trucks

6.2.1.1 Containers. Bulk containers are to be used for transporting all materials entirely within the Hanford Site between the 100 Area and the 200 Area and for transporting clean material to the clean stockpiles within the 100 B/C Area.

Westinghouse Hanford Company's Packaging Safety Engineering group has determined that all of the materials to be transported in the bulk containers can be classified as low specific activity (LSA) (WHC 1993b). Shipments of LSA materials transported exclusive-use must be packaged in strong, tight packages so that there will be no leakage of radioactive material under conditions normally incident to transportation.

Container design is depicted on Drawing H-1-80241. Design features of the containers are listed as follows:

- Only one container design is provided to handle all materials.
- The containers are constructed of steel with the structural integrity needed to withstand the anticipated operating conditions.
- The container is reusable.
- The container is open over its entire top area to facilitate filling with excavation equipment with no restrictions.
- The top opening is covered with a metal lid which is designed to prevent fugitive dust generation during railcar transport. The lid is designed to be placed and removed rapidly (within 1 minute) using a forklift. Lids are secured by two tie-down straps which attach on the sides of the container.
- An end gate provides an opening over the entire end area of the container such that contents are fully discharged upon tilting the container. The gate is provided with a reusable gasket to prevent spillage of soil contents under normal conditions of container filling, transfer, or transport.
- A gate latch mechanism is provided on the container to allow remote operation from inside the truck cab.
- Locking attachments are provided on the bottom four corners of the container to secure the container to the truck-trailer frame. The locking attachment is capable of remote operation from within the trailer cab.
- Lifting attachments are provided on the top four corners of the container to facilitate lifting by the container handler. The lifting attachments provide a means of locking the lifting mechanism to the container while the container is being lifted.
- Maximum design gross weight (container and contents) is 100,000 pounds (50 tons).
- Size of the container is nominally 8 ft in width, 20 ft in length, and 6 ft in height. Actual dimensions will be specified based on the maximum design weight. When the lid is applied and the container is filled to capacity

(maximum 90% by volume) the container gross weight will not exceed the weight limit.

- The inside leading edges of the container floor are rounded to facilitate complete emptying and interior decontamination.

- To facilitate decontamination, the container exterior surfaces are smooth and are painted with a coating which resists particulate adhesion.

Container systems have been specified to conform to the substantive requirements of RCRA (40 CFR Part 264, Subpart I) and the corresponding WAC regulations. Container systems have also been specified to provide remote handling of containers in conformance with the principles of ALARA. Although nearly all the material to be transported in bulk containers will present very low radiation doses (suitable for contact handling), relatively small quantities of buried waste components (e.g., irradiated reactor process tubes) must be handled which present potentially high radiation dose rates due to the presence of activation products (principally cobalt-60). Several engineered control options have been evaluated to allow container systems to be contact-handled:

- providing lead-shielded overpacks for the containers

- imbedding high dose components in soil within containers to provide self-shielding

- providing smaller shielded packages for high dose components; such packages would either be shipped separately or as inserts in the bulk containers.

Calculations of lead-shielding requirements for overpacks, assuming worse case conditions, showed this option to be impractical, i.e., the weight of the overpack would restrict the waste contents to impractical levels.

Imbedding high dose components in soil can effectively reduce dose rates. However, potential still exists for components to lie near container walls thus causing hot spots.

Providing smaller shielded packages requires a degree of item-by-item component segregation which is not practical in the overall material handling scheme.

The evaluation concluded that the best option would simply provide for remote handling of all materials. This is not difficult since the type of equipment needed to handle large, heavy containers are intrinsically remote operations which physically remove the operator to safe distances from the containers. Operations such as container monitoring, surface decontamination and surveying can also be readily designed as remote operations. In the current design, the latches for the tie-down straps pose potential difficulties because these must be manually operated. Alternative lid fastening devices, such as remotely operated latches, will be evaluated in the definitive design phase.

The design dose rate for the container is 200 mrem/hr at the surface and 10 mrem/hr at 10 ft. At these rates, additional operational controls are not necessary. A surface dose rate of 1 rem/hr is acceptable provided that operational controls are in place ensuring that exposure to personnel (e.g., at railroad/road crossings) is kept to acceptable levels. Containers exceeding a surface dose rate of 1 rem/hr may be approved on a case-by-case basis with concurrence from Packaging Safety Engineering, Packaging Shipping, Waste Safety Assurance, and Radiation Safety.

Since containers will move entirely on the Hanford Site, north of the Wye Barricade, compliance with Department of Transportation (DOT) requirements for radioactive material shipping is not necessary. However, in keeping with standard Hanford practice, design of containers and transport systems should provide "DOT equivalence," i.e., affording the same level of safety as provided under DOT. This equivalence of safety in packaging design will be detailed in a safety evaluation for packaging (SEP) to be completed by WHC's Packaging Safety Engineering group. This evaluation will review the preliminary design proposed above, prepare packaging design criteria, and produce the SEP report which will form the basis for definitive design of containers.

6.2.1.2 Trucks. Trucks for hauling containers are specified based on the following criteria:

- Trucks must be capable of handling the gross weight of the container (50 tons) over paved, gravel and dirt roads and over ramps at 10% grade.
- Trucks must be maneuverable on ramps and within excavations.
- Trucks must be operable at a speed which does not unnecessarily delay or constrain the excavation and transport operations.
- The container must reside on the truck frame while it is being filled and the height above the ground must be such that it can be reached by the excavation and loading equipment.
- The truck (or trailer) frame must provide attachments for lock-down of the containers, for remote operation of the container locking mechanism (from inside the truck cab) and for remote operation of the container latch mechanism.
- The truck (or trailer) must provide a tilt cylinder, actuated from inside the cab, for emptying the contents of the container.
- The truck (or trailer) frame should include a provision for indicating the point at which the maximum container gross weight has been reached.
- The truck (or trailer) frame must provide a clear access from below for decontaminating the bottom of the container with a water wash without removing the container from the truck.

- Truck cabs must be capable of providing a high-efficiency particulate air (HEPA) filtered air supply.

- Consideration must be given in the design of the trucks to the nearly constant wet conditions as a result of the water sprays in the decontamination station.

- It is desirable that the truck be capable of hauling containers over standard highways in the event that rail systems are not available for haulage.

- It is desirable that the trucks be interchangeable with those used at the disposal facility for hauling containers.

Both construction-type and highway-type trucks were evaluated against the criteria listed above. The highway-type tractor/trailer combination such as used in the UMTRA Grand Junction project were judged best at meeting the above criteria (see Drawing H-1-80235). All criteria are met with the use of the highway-type trucks and these were therefore selected for the preliminary design. While rigid body construction-type trucks are generally faster and more maneuverable under the conditions encountered in excavation operations, they do pose limitations:

- Unless specially constructed, the rigid-body trucks are too high off the ground for reach by the front end loader.

- Construction-type trucks are generally too wide for routine highway travel.

Derivation of truck quantities is discussed in Section 6.2.4.

Experience reported in the UMTRA Grand Junction project indicates that the trucks required abnormally high maintenance due to frequent decontamination cycles. The most frequent maintenance involved replacement of lights, radiators and gear boxes. At this stage of the design, the situation is managed merely by increasing the maintenance allowances in the cost estimate. However, for future design efforts, alternatives should be evaluated such as specification of truck components less susceptible to wet conditions, use of decontamination procedures not involving water, or decontamination of containers in a separate system (containers not mounted on trucks while being washed).

6.2.2 Container Transfer Area

The container transfer area is the point at which loaded containers are off-loaded from trucks to rail cars and empty containers are transferred from rail cars to trucks. This area also provides interim storage of containers, should storage be necessary. This area also provides storage of spare containers which are available to handle peak loading conditions.

Location of the container transfer area is depicted on Drawings H-1-80224 and H-1-80243. The area selected for this preliminary design is located adjacent and west of the Audrey Switch.

Selection of the site for the container transfer area is based on the following criteria:

- The area must be centrally located, i.e., readily accessible from all truck haul routes and providing flow of trucks from the classification and decontamination operations with minimal backtracking of loaded trucks.
- The area must provide capability for placing two trains of railcars simultaneously on separate sidings: one train of cars being loaded with filled containers and off-loaded of empty containers and one train of cars arriving from the disposal site as the first is completing loading operations.
- The location should minimize the need for constructing new track and should minimize the need for track upgrades.
- Adequate area must be provided for truck turnaround.
- The location should minimize the truck haul distance.
- The location should not interfere with excavation operations or be impacted by excavation operations, i.e., not in a location where track would have to be removed to complete the excavation.
- The container transfer operations must not impede any other operations.
- The area should be sufficiently separated (buffered) from activities which could potentially interrupt container transfer operations as a result of contamination spread.

Five alternate locations for the container transfer area were evaluated as follows:

1. the Audrey Switch
2. the switch adjacent to the intersection of the Route 1 and Route 6 roads
3. the switch southeast of the 116-C-5 retention basins
4. the switch southeast of the 118-B-3 site
5. the switch south of the 128-C-1 site.

Based on the evaluation of locations against the criteria listed above, the Audrey Switch location is selected as best meeting all of the criteria except haul distance. The Audrey Switch represents the longest truck haul distance of all possible routes. However, this impact is judged as an asset because the remote location provides additional buffering against site activities. Other drawbacks are listed as follows:

- locations 2, 3, and 5 are not centrally located
- locations 3 and 4 would be impacted by nearby excavations
- locations 2 through 5 would require significantly greater track upgrades

- locations 2 through 5 would complicate material movement logistics and would not provide the desired separation of loading operations from operations potentially generating airborne contamination.

Location 1, the Audrey Switch, maintains adequate separation from other operations, provides ample area for interim container storage (if required), provides ready access to both tracks for container on- and off-loading, provides adequate area for truck turnaround, does not require new track and minimizes the quantity of track requiring upgrade.

Operation of the container transfer area is described as follows:

- One train of empty containers transported from the disposal facility is placed on one leg of siding by the locomotive.

- The container handler (see Drawing H-1-80236) removes the first empty container from one end of the rail car and places it on an empty truck parked adjacent to that car.

- The truck which receives the empty container leaves and is replaced by a truck with a filled container.

- The container handler lifts the filled container from the truck and places it on the now-vacant railcar in the same spot as the empty container which was just removed.

- This alternating sequence of container transferring continues along the length of the train until all railcars hold filled containers. The train remains stationary during the container transfer process.

- The train with filled containers leaves the container transfer area for the 200 Area disposal facility.

- The container handler moves to the opposite siding and repeats the cycle of transfer operations on the train of empty containers.

6.2.3 Rail System

Based on the rail system upgrade assessment performed by WHC (WHC 1993b), the rail system in the vicinity of the Audrey Switch will require upgrade to meet Class 3 standards allowing operating speeds of up to 40 mph for freight trains. The assessment defined the following general activities required to restore the rail sections:

- inspection
- surfacing
- rail replacement
- compensation plate replacement

- ballast maintenance
- weed control
- tie replacement
- turnout repair
- crossing maintenance
- sign maintenance.

Based on the design rate and container cycle times (see Sections 4.7.2.2 and 4.7.2.3), the rail system will be required to handle 108 containers per shift. The rail system is conservatively sized to provide three trains of 15 rail cars each for a total of 45 cars. Each car will accommodate two containers. To meet the required rate, a train schedule is specified which projects five train loads per shift round trip (See Figure 4-7). This rate will accommodate transport of 150 containers per shift.

To size the locomotives and to specify train cycle times, the following factors were evaluated:

- a proposed routing from the Audrey Switch into the disposal facility (see Drawing H-1-80225)

- the length, grade, and degree of curve for each section of existing track along the route

- new track serving the disposal site was considered; grades and distances along this extension were conservatively specified for design purposes.

Based on this design evaluation, a 200 ton, 3,800 horsepower locomotive would provide a one-way cycle time of 30 min from Audrey to the disposal site. A reserve locomotive should be available when the active locomotive(s) are out of service.

Sixty used railcars have recently been acquired by DOE-RL from the U.S. Army. It is intended that these railcars be modified for use in Hanford site remediation programs (see Drawing H-1-80234). The cars were manufactured by the Magor Car Corp (Magor Drawing No. T-10814). Each six axle flatcar is rated at a 100 ton capacity. Tare weight of the cars is approximately 35 tons. Cars are nominally 54 ft long and 10.5 ft overall width. Modification includes replacement of wood decking with metal and is assumed to be accomplished prior to project implementation. Installation of brackets to accommodate containers will be part of project implementation.

6.2.4 Required Quantities of Containers, Trucks and Railcars

Derivation of the quantities of containers, trucks, and railcars is based on the following design parameters:

- Design excavation rate of 3900 LCY/shift (See Section 4.7.2.2).

- Containerized material (which excludes overburden and ramp material) = 3321 LCY per shift.
- Maximum cycle time of a truck from start of filling at the excavation to the point at which the container has been off-loaded at the container transfer facility is 43 min round trip (See Section 4.7.2.3).
- Maximum cycle time of a truck from start of filling at the excavation to dumping at the central clean stockpile is 20 minutes round trip (See Section 4.7.2.3).
- Maximum cycle time of a truck from start of filling at the excavation to dumping at local stockpiles is 13.5 minutes round trip (See Section 4.7.2.3).
- Containers are filled with 27 LCY of material except during fringe excavation; in fringe excavation, containers are filled with 5 LCY.
- Productive operating hours = 5.25 per shift.
- Three trains of railcars are provided. Each rail car holds two containers. Five trainloads of containers are moved round trip to the disposal site each shift.

Based on these design parameters the following quantities are derived:

- A fleet of 20 trucks is required for hauling containers; it is assumed that the disposal facility will have the same number of trucks for estimating the number of containers required.
- Thirty-three (33) rail cars are required; however, the design assumes that 45 are provided (See Section 6.2.3).
- One hundred five (105) containers are required; however, the design assumes that 130 are provided.

6.2.5 Roadway System

A roadway system forms the links between the waste site excavations and the railroad system. The system consists of improved haul roads maintained over the course of the project for trucks to haul excavated material from the excavations to the container transfer area. The layout and routing of truck traffic are discussed in Section 4.3.5. The haul roads will be provided in two ways: by improving existing roads and by building new roads. Details of the design, construction, and maintenance of the haul road network are discussed in the following paragraphs.

At the design excavation rate and considering a typical loaded truck weight of 65 tons, some sections of roadway will be subjected to about 2,500 daily 18-kip equivalent single-axle loads. It is not cost effective to design haul roads which will last the life of the project and will withstand this degree of loading. A gravel-type road design is more economical to construct, easier to maintain, and easier to reclaim at project closeout. Frequent maintenance of the haul roads, regardless of construction, can be expected.

Details of the road construction showing the two general types of haul road sections are shown on Drawing H-1-80247. Plan views showing the subbase grading requirements and roadway profiles are shown on Drawings H-1-80233, Sheets 1 to 13; H-1-80251, sheets 1 and 2; H-1-80252, sheets 1 and 2; and H-1-80253, sheets 1 and 2. Haul roads are constructed using suitable structural fill to provide a supportive roadway subbase. The surficial material found at the site should be suitable for this use. This material can be obtained in a cut and fill type operation performed by a road grader or scraper. The subbase material is placed in lifts and compacted. If a pre-existing asphalt roadway is present, the subbase material is brought up to an elevation even with the existing roadway. A well-graded base (top) course material is then placed over the subbase. If a pre-existing asphalt roadway exists, an asphaltic adhesive is placed over the existing pavement to minimize the potential for failure along this unconformity. The base course, nominally 25 cm (approximately 10 inches) thick, is then placed in one loose lift. Prior to compaction, a polymer based stabilizing agent is topically applied. Compaction then proceed using a smooth drum roller.

Roadways through the facility areas to the container transfer area are constructed in the same manner as haul roads. The subbase grading requirements are shown on Drawings H-1-80244 and H-1-80245. Each container transfer section is designed to be wide enough to allow trucks to turn around and maneuver for both storage and rail loading operations.

Maintenance of the roadways is performed as needed by regrading, addition of top course material as needed, applying additional stabilization agent, and recompaction. This can be achieved with a minimum of time and expense. Routine topical applications of stabilization agent aid in maintaining durability and reducing emissions of fugitive dust.

6.3 DECONTAMINATION FACILITY

This section describes the preliminary design for equipment decontamination, equipment surveying, and personnel decontamination.

6.3.1 Container Surveying

<u>Purpose of the Survey</u> - The radiation dose rate emitted by the container is required to determine the need for special administrative controls in transporting the container to the ERDF by rail, e.g., access controls at road crossings. The dose rate measurements also alert the operators performing the container wipe testing that remote equipment (e.g., long handled tongs) may be needed to perform their wipe sampling.

The wipe sampling quantifies the surface smearable (removable) contamination on the container surface. This allows an assessment of the effectiveness of decontamination and also ensures that there is a low probability for spread of removable contamination during container rail transport.

Requirements - The dose rate emitted by the container at a distance of 10 ft from both sides of the container is measured as the vehicle enters the container survey area. Dose rates on the ends of the container need not be measured because the radiation field in these areas is emitted in the same direction as the travel of the railcar. All containers are surveyed for surface smearable contamination regardless of dose readings. Those containers which exceed the dose limits (see Section 6.2.1.1) continue on to the container transfer area for temporary storage awaiting a case-by-case determination of shipment requirements. Containers which do not exceed the dose limits continue on to the container transfer area for shipment using established procedures.

Transport of radioactive material for on-site shipments must meet the shipping requirements as specified in 49 CFR Part 173 in accordance with WHC Radiation Control Manual, Article 424, Item 2 (WHC 1993e). These requirements specify that the level of non-fixed (removable) radioactive contamination on the external surfaces of each container conform to the principle of ALARA. Maximum permissible limits for on-site shipments are provided in Table 6-1. Minimization of contamination spread and equipment decontamination provide the means to satisfy these requirements.

Beta and gamma emitters are the only radionuclides of concern because alpha emitters, if present, are not expected to be within the range of detection. The regulation also requires that the smearable contamination be determined by wiping a surface area of 300 cm^2 with an absorbent material using moderate pressure, and then measuring the activity on the wiping material.

Procedures for the release of containers are documented in the *Health Physics Procedures*, Section 3.2.2 (WHC 1993f) and the *Westinghouse Hanford Company Radiological Control Manual* (WHC 1993e).

Survey Station Description - Two survey stations are provided in parallel to accommodate the vehicle traffic. The survey stations are located after equipment decontamination and prior to the container transfer area (see Drawings H-1-80224 and H-1-80239). Dose rates are measured by stationary instruments located at a 10 ft distance from both sides of the container. The truck is guided by an individual on the ground. The trucks are then parked next to the survey shelter for wipe sampling. Containers passing the wipe survey go directly to the container transfer area. Containers failing the wipe survey are routed through the container decontamination station for a more aggressive decontamination and surveyed again upon exit. The general layout of the survey stations is shown in drawing H-1-80237.

Both survey stations operate in an open-air environment. A small, three sided shelter is provided to allow protection from weather while counting. A shield wall ensures that there are no background interferences from the container while counting the wipes (see

Drawing H-1-80237). The shelter provides storage for used and clean wipes, and provides a computer terminal for access to the data acquisition system.

Wipe Sampling and Counting - The 17.5 x 17.5 cm wipes are used to wipe the middle of each side of the container, and the middle of each end of the container. The wipes are mounted on long poles to keep the operators at a safe distance from the container. A hand held wipe is used for surveying any irregular surfaces which may be points of soil accumulation. Use of the hand-held wipes is dependent upon the radiation dose rates, i.e., if dose rates are high, the hand-held wipes are not used.

The counting is performed with a beta-gamma detector which is capable of counting the area of the wipe rapidly. Counting of each wipe should not take more than about 20 sec to complete.

Estimates of time required to complete a container survey range from 3 min to 15 min. It is desirable that container surveying time be kept to a minimum to assure optimum material flow through the system using a minimum of trucks and containers. The issue of container surveying will be further evaluated to identify strategies or equipment which minimize the surveying time.

6.3.2 Equipment Decontamination

Spread of contamination is minimized at the excavation site in three ways:

- Dust suppression is provided to control airborne contamination.
- Containers and trucks are designed with a minimum of horizontal surfaces where contaminated material can deposit.
- Excessive amounts of material on the exterior of the container or truck is manually removed prior to leaving the excavation site.

The equipment decontamination facility provides additional measures to ensure that the maximum permissible limits are achieved for on-site shipments of containers. The facility also provides periodic cleaning of excavation equipment such as excavators and loaders.

Current Hanford decontamination practices have shown that a simple water/steam wash system provides adequate decontamination for soil removal. Article 463 of the WHC Radiological Control Manual (WHC 1993e) states that water and steam should normally be used as decontamination agents. Previous engineering studies on decontamination support the conclusion of a water/steam wash system, (DOE-RL 1993f and Field 1990).

The equipment decontamination facility includes a primary system consisting of an automated spray wash system, collection basins, and wastewater treatment. The automated spray wash system is used for routine container decontamination. A secondary system consists of a portable spray wash unit. The secondary system is available for non-routine or emergency use and to decontaminate excavation equipment. The equipment decontamination facility arrangement and design are provided in drawing H-1-80228. Utility requirements are discussed in Section 6.6.3.

The automated spray wash system is designed to accommodate a highway-size tractor and trailer. The top and sides of the container are decontaminated via U-shaped spray bars which wash the top and sides of the closed container as the truck drives through the wash station. Undercarriage spray bars are used to decontaminate the bottom of the container. Two sets of spray bars are provided: one for detergent wash and one for rinse. The detergent wash spray bar is only used periodically. Container decontamination is estimated to take about one minute. A structure encloses the automated system to prevent wind entrainment of contaminated spray.

The secondary manual wash system, which is not within an enclosure, incorporates a hand-held hose and spray wand which are operated manually. The secondary system includes capability for both water and detergent wash. Spray migration in the secondary system is controlled through application of administrative controls, i.e., decontamination operations are not conducted in windy conditions.

Both the automated and the manual wash systems are located on separate sloped concrete slabs which drain into a collection basin. Some settling of solids occurs in the collection basin. Water from the basin is pumped to a wastewater treatment system where additional solids settling occurs thus clarifying the water. Capability is provided to recycle the clarified wash water, although it is intended that the water be routinely pumped to tanker trucks and used at the excavation sites for dust control.

Capability is provided to periodically remove solids which settle out in the basin(s) and wastewater treatment system. Solids are removed as a slurry into a vacuum truck. Vacuum truck solids are hauled to the ERDF.

6.3.3 Personnel Decontamination

Personnel decontamination and change facilities are provided in two separate locations. The change facility (see Drawing H-1-80229) is located at the exit to the 100 B/C exclusion area between the equipment decontamination and office facilities. Two decontamination stations are employed, one near the office area and one on the west side of the 100 B/C exclusion area (see Drawing H-1-80230).

The preliminary design of the personnel decontamination stations considers the following assumptions:

- Design is for one hundred (123) employees on-site during each shift (see Section 9.2).

- Gender distribution is 70% male and 30% female (i.e., 86 males and 37 females per shift).

- Separate change facilities for male and female employees.

- Two shifts are working each day, but only one shift occupies the change facility at one time.

- Decontamination trailers are provided for removal of personnel protective equipment (PPE); portable toilets are used on the condition of a self survey.

- Breaks include a morning and afternoon break and a one-hour lunch break in the middle of the day.

- The morning and afternoon breaks are taken at the decontamination trailer location.

- The lunch break is taken at the office area.

- 4 sets of PPE are required per person, per shift
  - one in the morning
  - one after the morning break
  - one after lunch
  - one after the afternoon break.

- 2 showers are required per person, per shift
  - one at the lunch break
  - one at the end of the day.

- Portable toilets are used twice per person per shift.

- Toilets at the change facility are used two times per person, per shift.
  - one in the morning
  - one at the end of the day.

- Sinks are used at same frequency as the toilets.

6.3.3.1 Decontamination Stations. The decontamination stations are used for removal of PPE consisting of at least "whites", rubber boot covers and rubber gloves. These stations allow removal of protective clothing worn in a contaminated area, with employees remaining in Level D protection after the clothing change. Level D consists of coveralls, safety shoes, safety glasses or goggles, hard hat, and gloves. Level D protection is required for all personnel inside the 100 B/C exclusion area.

Portable toilets are provided at each excavation site and require personnel decontamination and PPE removal to Level D for usage. A self-survey is required to enter and exit the toilet area.

The decontamination stations allow for the washing and rinsing of rubber boot covers and outer rubber gloves, tape removal, cloth boot cover removal, outer PPE (whites) removal, and inner glove removal. A final survey of each individual is required to exit a decontamination station (see Drawing H-1-80230).

Assuming that there are two bathroom breaks, and one lunch break requiring decontamination and PPE removal in addition to the end of the shift, the decontamination station is used by each individual four times per shift.

The decontamination stations provide the capacity to store water for routine personnel decontamination (4 times/person/shift) as well as sufficient reserves for emergency showers and eye washes. The station is also equipped for the temporary storage of discarded, reusable protective equipment awaiting transport to the laundry facility. The capacity to store waste decontamination solutions is also provided.

6.3.3.2 Change Facility. In compliance with 29 CFR 1910.120 and 1910.141, a central change facility (see Drawing H-1-80229) is provided at the entrance to the 100 B/C exclusion area. One facility is provided for male employees and one facility for females.

Each facility provides a working change area for donning and removing work clothes (Level D), shower area, and a clean change area for donning and removing modesty and street clothing. Water closets and wash basin facilities will be provided in the clean change area. Lockers will be provided for each employee in both change areas (see Drawing H-1-80239).

At the beginning of a shift, each worker removes street clothing and dons modesty clothing to be worn under the Level D protection. Employees exit the clean change room to the working change room where they don Level D protection. The employees then exit the change facility and leave for their work location.

At the end of a shift, employees enter the working change area and remove their Level D protection for storage in lockers. Each worker is then required to shower prior to entering the clean change area and leaving the facility.

At the lunch break, employees follow the same exiting procedure, but don coveralls in the clean change area for exit to the lunch facilities.

The change facility is connected to a potable water source with sufficient capacity to support shower, toilet and lavatory facilities. The facility is also connected to a holding tank capable of receiving waste water.

The working change area houses sufficient lockers for all shifts of workers. Benches are provided for sitting while dressing and undressing. The lockers in this area provide storage of Level D clothing only. A towel storage unit provides enough towels such that each individual is provided a towel for showering. Exit from the working change area is via the shower area only to assure that each employee showers.

The showers are located between the working change area and the clean change area. The regulation in 29 CFR 1910.141(d)(3) states that one shower be provided per ten employees of each sex who are required to shower during the same shift. The entrance to the shower facilities is from the working change room, with the exit to the clean change room.

Water closets (toilets) are provided in the clean change area. They are assumed to be fully enclosed with locking doors and are the tank-style. The regulation in 29 CFR 1910.141, Table J-1 specifies the requirements for water closets.

The lavatories (sinks) are located in the clean change area. There are no requirements for the number of sinks in the change facility, therefore it is assumed that number of sinks should equal the number of water closets.

The clean change area provides for changing from street clothes to modesty clothing or clean coveralls. The facility provides the capacity to house lockers for all shifts with the assumption that only one shift will occupy the change area at one time. In addition to the water closets and lavatories, the clean change area also houses used towel hampers and clean coverall storage. The entrance and exit to the clean change area allows access to the office support area.

6.4 EQUIPMENT MAINTENANCE

Equipment such as haul trucks, idle excavation equipment, damaged containers, and miscellaneous parts and equipment are staged in a graded and compacted equipment staging area located east of the 105-B Reactor Building (see Drawing H-1-80224). All haul trucks and mobile equipment not assigned to specific excavations are parked in this area during the off-shift hours.

The equipment staging area incorporates the following systems:

- two parts trailers for storage of commonly needed parts and tools
- lighting to accommodate off-shift maintenance
- potable water supply from portable tanks
- steam cleaning and parts washing equipment
- electrical outlets for connection to engine block heaters in the haul trucks
- storage areas for new as well as waste oils and fluids
- a fuel tank used to supply the mobile fueling truck (located east of the staging area on the boundary of the 100 B/C site such that it can be filled from outside and tapped inside the exclusion area).

Truck and Container Maintenance - Haul trucks, water trucks, the fuel truck, maintenance vehicles, and containers are serviced on a routine basis at the equipment staging area. The routine maintenance occurs on the off-shift when the vehicles are parked in the staging area. Emergency maintenance is normally performed by the maintenance crew at the location of breakdown, utilizing tools and equipment on-board the maintenance vehicles.

Heavy Equipment Maintenance - Heavy equipment used in excavation, reclamation, and road maintenance are typically maintained at the site of their operations. Routine maintenance is only performed at the equipment staging area when the particular piece is idle or when it is convenient to bring the piece in for servicing. Emergency maintenance is normally performed at the location of breakdown.2

Transport Vehicle Maintenance - Routine maintenance of the transport vehicles (e.g, vans and pickup trucks) is performed by Hanford craft personnel, as a site service; maintenance is performed at either the regulated vehicle maintenance shop located in the 200 Area or the shop in the unregulated 1100 Area shop. Emergency maintenance is performed at the location of breakdown by on-site maintenance personnel.

6.5 DUST SUPPRESSION

The excavation, transport and storage of excavated soils may generate significant quantities of fugitive dust. Dust control measures are provided to reduce the spread of contamination by entrainment of fugitive dust, to minimize the impacts on local air quality and to minimize the exposure to on-site personnel. Dust sampling is performed to monitor the effectiveness of the control measures.

The major points of fugitive dust generation are:

- at the excavation
- on the waste site access ramps and other non-treated roadways
- during backfill operations
- at the clean soil storage stockpiles.

Water sprays are the primary means for controlling fugitive dust. Rates of application are developed primarily for estimating water usage for the design of associated infrastructure. Actual application rates will be dictated by field performance.

The following subsections describe dust control methodology for each of the major emission points.

6.5.1 Excavation Activities

Water is applied to the active excavation face and at each point of emission where material is handled (e.g., dumping of soil into a container). Design bases and assumptions are listed as follows:

- Sprays are applied at a rate of 1 gal/yd^2 per lift (EPA 1985).
- The area of excavated material is 11,700 yd^2 of excavation face per shift (derived from the 3,900 yd^3/shift production rate); therefore, 11,700 gallons of water are required for this area.
- Assuming a maximum of four excavations operating at one time, approximately 2,925 gallons of water are necessary at each excavation per shift.

Water is supplied to each excavation site by water trucks. The water trucks are filled at the decontamination station (see Section 6.3.2). The water trucks are each equipped with a hose of sufficient length to reach all areas of application and a variable rate nozzle. The truck operator is tasked to apply the water to the excavation as appropriate(the effectiveness of dust suppression is determined visually). When a truck is nearly empty, a full truck is dispatched to the site to ensure continuous operation.

A crusting agent is applied to all active excavations at the beginning of the off-shift to stabilize the disturbed surfaces overnight and on weekends. The crusting agent is mixed in the truck and applied as recommended by the supplier.

6.5.2 Access Ramp and Haul Roads

The access ramp and haul roads for each excavation require water applications to control fugitive dust. Water sprays in these areas are applied as relatively fine mists to avoid forming mud. Muddy soils risk spreading contamination further because the mud can stick to the truck tires.

The haul roads are constructed and maintained with a gravel surface treated with a chemical additive (soil cementing agent). This results in a solid surface with properties similar to that of a paved road. Water application rates for the untreated areas including ramps and access roads connecting to the haul roads are based on the following:

- water is applied at a rate of 0.125 gal/yd^2 every 20 minutes (approximately 2 gal/yd^2 per shift) (EPA 1985)
- the total area of access ramps and access roads is approximately 6,560 yd^2
- a total of 13,120 gallons of water per shift is required for dust suppression at the access ramps and untreated haul roads.

The treated sections of road are not considered in the application rate estimate, because the construction of the road itself reduces the emission of dust; however, periodic watering may be required on areas of high travel (see Section 6.2.5).

6.5.3 Backfill Activities

To suppress dust and aid in compaction, water is applied during backfill and regrading operations. It is assumed that the application rates for backfill are similar to the rates for excavation. Therefore, 2,925 gal/shift is assumed for each backfill and regrading operation. At most, there will be two backfill and one regrading activity occurring at one time; thus a total of 8,775 gal/shift of water is required.

6.5.4 Storage Stockpiles

Active dumping areas of the clean soil storage stockpiles are stabilized by water application during on-shift hours. The stockpiles are stabilized with a continuous irrigation sprinkler. The sprinklers are relocated as necessary to follow the active dumping area. One sprinkler is assumed for each stockpile with an application rate of 3 gal/min per sprinkler. This results in 1,440 gal/shift per stockpile.

On the off-shift, the freshly deposited spoils are stabilized by application of a crusting agents (from trucks). Crusting agent is applied as recommended by the supplier.

6.6 SUPPORT SYSTEMS AND FACILITIES

Support systems and facilities include the office area, site services, and utilities

6.6.1 Office Area

An on-site office complex is provided to support the 100 B/C remediation activities. The office complex consists of office trailers and trailers which house change facilities for both male and female operating personnel. The remainder of the area is designated for personnel parking. The office area is depicted graphically on Drawing H-1-80240. The change trailers are described in Section 6.3.3. The individual trailers and dimensions are tabulated as follows:

Trailer	Nominal Size, ft
General office space	42x70
Lunch room	28x60
Medic/first aid station	8x26
Change rooms	
- Male	28x60
- Female	14x60
Data acquisition system	24x48

Parking spaces for 300 employees and visitors are provided.

The following sources provide requirements and/or design guidance for the trailer facilities:

- 29 CFR 1910, Subpart J - General Environmental Controls
- 41 CFR 101, Public Contracts and Property Management
- DOE Order 6430.1A, General Design Criteria
- *Standard on Fire Protection for Portable Structures* (DOE 1979)
- *Transportation Engineering, Introduction to Planning, Design and Operations* (Yu 1982).

The trailer housing the data acquisition system also includes office space for the site supervision, cognizant engineers, area controller, construction supervisor, and truck supervisor. This trailer is considered as the command and control center for all field activities and is indicated on the drawing as the Group 1 office.

The general office trailer provides space for the safety officer, the health physics supervisors, clerk/secretary, and a Hanford local area network (HLAN) operator. Field personnel, such as the field team leaders and health physics technicians, have space provided to perform end-of-shift paperwork. Additional space is provided for a visitor office and a conference room. The general office trailer is indicated on the drawing as the Group 2 office.

The lunch trailer provides eating space for all personnel on duty during a shift. The trailer also includes refrigerators, microwaves, and sinks for food storage and preparation. The lunch trailer is also used for large meetings which can not be accommodated in the office trailers.

The medic/first aid station consists of a small mobile trailer and a carport. The mobile trailer provides office space for the medic and an open treatment area. The first aid station is used to treat minor medical problems and emergencies.

6.6.2 Off-Site Support Services

In this pre-design report, off-site support services are defined as those which are not provided from within the 100 B/C Area, i.e., are provided by other entities or organizations at other Hanford locations or are provided from entities outside of Hanford. These off-site services fall into the following general categories:

- emergency and security
- communications

- maintenance
- sanitation
- miscellaneous.

Each of the services within these general categories are described below.

6.6.2.1 Emergency and Security Services. Fire protection and medical services - On-call ambulance and Emergency Medical Technician (EMT) capability will be available at the 100 B/C site. Existing Hanford personnel provide advanced medical service and transport if appropriate. Minor fire response is the responsibility of 100 B/C personnel using available equipment. Major fire response requires the assistance of the Hanford Fire Department. Response to hazardous spills is a shared responsibility depending on the nature and severity of the situation. The primary responsibility in hazardous situations is with 100 B/C personnel.

Security - Security services include routine patrols of the 100 B/C Area to ensure security of equipment and facilities, control of site access, and badging support. The service is provided by Benton County as well as Hanford security personnel.

6.6.2.2 Communication Services. Telephone - Telephone support services are required to install telephone lines and maintain the system throughout the project. Telephone lines are used for telephones, fax machines, and computer communication. The design assumes that the existing Hanford telephone support contract is used.

Mail - Mail services are required throughout the project. The existing Hanford mail service will be used for on-site as well as off-site deliveries. Express mail service pick-up and delivery is also required. The 100 B/C personnel are responsible for collecting the mail in a central location for pick up.

Radio - A trunked radio system is to be used for on-site communication. This system allows closed frequency communication throughout the project. Maintenance and upgrades will be supplied as necessary by existing Hanford organizations.

Computer - Local area network (LAN) access is required by the project. This requires support from the network administrators. Software and hardware installation and maintenance is also necessary. The Global Positioning System (GPS) will be coordinated with the computer system. Management of the LAN will be an ongoing service with maintenance, installation and troubleshooting support being provided as-needed. Existing computer support services will be used. The analytical plan provides additional details on computer needs for the data acquisition system (WHC 1993d).

6.6.2.3 Maintenance Services. Rail Maintenance - Maintenance of the rail system is required on an as-needed basis, with routine assessments to be scheduled throughout the project. This will be provided by Hanford craft personnel. Locomotive maintenance services will be provided in the new rail maintenance facility located in the 200 Area.

Facility Maintenance - The office facilities, on-site labs, and support facilities within the 100 B/C exclusion area require routine as well as emergency maintenance. This will be provided by existing Hanford maintenance organizations.

Personnel Transport Vehicle Maintenance - Routine maintenance and repair of personnel transport vehicles are provided by existing Hanford craft personnel. This maintenance support does not include maintenance of haul trucks or other vehicles associated with excavation operations. Emergency maintenance of the transport vehicles will be accomplished by 100 B/C personnel.

Field Instrument Maintenance - Field screening instruments and other portable instrumentation will be regularly maintained by existing Hanford services. Emergency repairs will be the responsibility of 100 B/C personnel.

6.6.2.4 Sanitation Services. Janitorial - Facility cleaning (offices and laboratories) will be performed by existing Hanford personnel.

Refuse - Routine refuse removal services will be provided by existing Hanford organizations. The 100 B/C personnel will be responsible for collecting all refuse in a central location for pick up.

Portable toilets and non-contaminated sewage removal - The portable toilets used on-site will be serviced on a regular basis. Non-contaminated sewage will be removed from holding tanks at the office area on a regular basis. Existing Hanford personnel will be responsible for sewage removal.

Laundry - Laundry service for 100 B/C is a shared responsibility. On-site (100 B/C) personnel are responsible for pick up and delivery to a central location. From the central location, Hanford personnel will be responsible for the laundry function and return of clean clothing to the 100 B/C area.

6.6.2.5 Miscellaneous Services. Respirator/Small Equipment Decontamination - Respirator cleaning services will be provided on a regular basis by the existing Hanford facility. Small equipment decontamination will be provided on an as-needed basis by 100 B/C personnel.

Training - The existing Hanford training facility and programs will be used for initial as well as refresher training of personnel working on the project. Site specific training such as safety, operating procedures, and emergency response will be provided on-site by 100 B/C personnel.

Dosimetry - Routine assessment of employee dose exposures will be accomplished by using the existing dosimetry services.

Office supplies and equipment - Office supplies will be provided by existing site services on an as-needed basis.

Utilities - Water and electrical utilities will be used throughout the project. Initial hook-ups, monitoring, and maintenance will be provided by existing Hanford site services.

Accounting - Program office personnel will be employed to manage the accounting activities for the project. This will require cost account and schedule planning and monitoring.

Procurement - Procurement activities will be the responsibility of existing Hanford procurement organizations.

Human Resources - Hanford personnel will be responsible for personnel related activities.

6.6.3 Utilities

The site utilities are divided into two types:

- water and wastewater utilities
- electrical and telephone/computer utilities.

Tie-in locations to the active systems are identified on the utility diagrams (Drawing H-1-80246). The general layout of the utilities is presented on the site facility drawings H-1-80239 and H-1-80243.

A discussion of each utility type is given in the subsections below.

6.6.3.1 Water and Wastewater Utilities. The water and wastewater utility requirements are summarized in Table 6-2. The requirements are estimated based on the number of site personnel (see Section 9.2) and typical water use rates (Metcalf and Eddy 1991 and EPA 1985). A brief discussion of each utility system is provided below.

Potable water - The potable water system treats Columbia River raw water as it is supplied via the existing export water line. The skid mounted system provides two semi-continuous filters and a chlorinator. The system operates 24 hours a day therefore requiring holding tanks to provide for backwash water and peak storage.

Applicable federal and state regulations include 40 CFR 141 and WAC 246-290. Monitoring of the system, as required by WAC 246-290-300, is provided as a service from the site water purveyor.

Sanitary waste - The sanitary waste system consists of two separate systems:

- wastes from the analytical services trailer
- wastes from the office area, including change facilities.

Each system consists of a gravity fed sump each equipped with two pumps. The first pump is designed to handle normal flow while the second pump provides additional capacity for peak flows. The pumped effluent is stored in holding tanks which are periodically pumped into trucks and hauled to the 100 N lagoons for treatment and disposal.

The use of holding tanks must comply with WAC 246-272. This regulation requires that the Washington Department of Health (DOH 1991) and Washington Department of Social and Health Services (DSHS and DOE 1987) guidance documents be followed. These documents state that a special waiver must be obtained to allow the use of holding tanks. The reviewing agency for the waiver is the Washington State Department of Health.

Equipment decontamination facility water supply and wastewater treatment - The water system supplies the influent to the equipment decontamination facility. The equipment decontamination facility treated effluent supplies the primary dust control water. As a backup, a hose connection is provided to supply raw water to the dust suppression trucks as required.

The effluent from the equipment decontamination system is gathered from a sloped concrete slab and collection basin as shown on Drawing H-1-80228. The soil which settles in the collection basin is pumped out on a weekly basis and sent to ERDF for disposal. Water from the collection basin overflows a weir located at one end of the collection basin; a submersible pump transfers the water to a holding/equalization tank. Additional sediments are removed from the water through the use of an accelerated gravity separator. The clarified water is then either recycled to the decontamination facility or loaded into trucks for use in dust suppression.

It is anticipated that the effluent from the equipment decontamination facility will not contain contaminants at a level of concern; therefore, it may be used unconditionally for dust suppression requirements. Data from the soil washing treatability study should confirm this assumption. As a contingency, a beta/gamma detector is placed in the effluent stream to monitor its suitability for use in dust suppression. Should the soil washing treatability data fail to confirm the assumption, additional treatment, such as ion exchange, may be implemented.

6.6.3.2 Electrical and Telephone/Computer Utilities. Implementation of the 100 B/C remediation requires expansion of electrical, telephone and computer services in the area. The existing active utility system is shown on Drawing H-1-80215. The active electrical system will be expanded to provide service to the ancillary facilities. New fiber-optic cables will be installed in the area and will provide both telephone and computer service within the area. The planned layout for the these improvements is shown on Drawings H-1-80239, H-1-80243, and H-1-80246.

Electric power is currently supplied to the 100 B/C Area via a 230 Kv power line and a substation located west of the 105-C Reactor Building. The voltage is reduced to 13.8 Kv for distribution to most of the site. Three-phase 2.4 Kv power is supplied to the 105-B Reactor Building, the 111-B Building, the 105-C Reactor Building, and the 190-C Building from a line derived from the 13.8 Kv power loop. Power to the ancillary facilities will be obtained by extending the 2.4 Kv line. This line may be extended using the existing power poles which run along the southern and eastern boundary of the area. A new overhead line will be installed to extend the power distribution to the container loading area. Generally, only 240/120 V single phase power is required for the office, lunch, change, and personnel decontamination facilities. Distribution of 480 V three-phase power is provided to the classification structure, the analytical facilities, and the equipment decontamination area to provide for operation of machinery and/or pumps. Area lighting is provided to allow for night operations for areas around structures, the main intersection providing access to the facility area from Haul Roads N and S, and in the container transfer area. Luminaries consist of 240/120 V high pressure sodium fixtures placed at approximately 25 meter spacings to provide 3 foot-candle illumination. No roadway lighting is provided. Excavation lighting is supplied by portable generators and portable lights. These portable lights can be tied in to the existing power distribution system. This will be evaluated in the definitive design phase. In addition, specific service and transformer requirements will be evaluated in definitive design.

A new fiber-optic line will be installed to connect the 100 B/C Area to outside telephone service. This line will be installed underground along the same alignment as the old telephone line, from the east along Route 1. The line will be diverted south parallelling the electric lines placed at the eastern and southern boundaries of the area then north to the 105-B Reactor Building. An extension to this system will be provided to the office areas, the analytical facilities and the classification structure. The system will be sized to provide both telephone and computer services (local and wide area network capabilities).

6.7 AREAS OF INTERFACE

The areas of interface delineate the divisions of responsibility for various aspects of the project and/or interfaces with other projects. Five primary interface areas are defined; these are shown on the project interface control drawing (H-1-80249). Each of the five interface areas is briefly described as follows:

D&D Program - The active D&D sites are listed in Table 3-1 and discussed in Section 4.4.1. The proposed haul route for reactor core decommissioning is shown on the drawing. Transportation requirements for the reactor core removal program will be coordinated with the 100 B/C remediation program as necessary to accommodate the needs of both programs.

Active Systems - The active systems are listed in Table 3-1 and discussed in Section 4.4.3. Tie-in locations for utility systems are identified on Drawings H-1-80239, H-1-80243, and H-1-80246.

Rail System - The rail line and spurs proposed for use during the project will be maintained by WHC. The interface points identify where the rail maintenance begins. Rail maintenance is discussed in Section 6.7.2.3.

Road System - All roads used inside the project area will be maintained by the 100 B/C remediation project. The interface points indicate the areas where road maintenance begins by others.

Site Services - Site services are defined and discussed in Section 6.6.2. The interface point for all site services will be through the office area.

Table 6-1 Removable External Radioactive Contamination Wipe Limits

Contaminant	Maximum Permissible Limit	
	uCi/cm^2	dpm/100cm^2
Beta-gamma emitting radionuclides; all radionuclides with half lives less than ten days; natural uranium; natural thorium; uranium-235; uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical concentrates.	10^{-5}	2,200
All other alpha emitting radionuclides	10^{-6}	220

Table 6-2. Water and Wastewater Requirements

Water or Wastewater Utility System	Description	Quantity
Potable water system	Office area	11,686 gpd
	Personnel decontamination facilities	1,824 gpd
	Analytical services	1,575 gpd
	TOTAL	15,085 gpd
Sanitary effluent system	Office area	11,686 gpd
	Analytical services	1,575 gpd
	TOTAL	13,261 gpd
Equipment decontamination facility water and wastewater utility system	Facility influent	33,900 gpd
	Dust suppression influent	78,710 gpd
	Facility effluent to dust suppression	33,900 gpd
	Additional dust suppression influent	44,810 gpd
	TOTAL Raw water influent	78,710 gpd
	Recycled effluent	33,900 gpd
Hauling service contracts	Personnel decontamination facilities	1,824 gpd
	Portable toilets	17 weekly
	Analytical services - lab packs (55 gallon drums)	13 weekly

7.0 EXPANDABILITY

The preliminary design is based on estimates of contamination volumes which are judged to be within a probable range as indicated by currently available data. Maximum volumes have also been estimated (see Section 4.1, Table 4-1, and Attachment 1 (Volume 2)) based on the predicted areal extent but assuming contaminant migration all the way to ground water in most cases. The difference between the probable and maximum estimates is about one million cubic yards or about 60%. Because of the uncertainties which exist with regard to areal extent of contamination, it is possible that the actual volumes to be removed are greater than the probable volumes estimated. Actual volumes will not be known until sites are excavated.

There are two strategies for handling larger waste volumes:

- expand operational capacities to accommodate greater productivity and throughput
- add time to the schedule.

For design and planning purposes, it is assumed that adding time to the schedule is not acceptable. Because many of the costs associated with remediation operations are fixed, additional time is usually not cost effective. Experience has generally shown that increasing productivity to meet higher volume demands is much more cost effective than stretching out the schedule.

The following subsections discuss specific contingencies which have been provided in the preliminary design to accommodate expandability. Where expandability has not specifically incorporated into the design, strategies are defined for achieving higher productivities.

7.1 EXCAVATION

Excavation and demolition operations use heavy mobile equipment which have been shown to be highly productive and reliable in mining, construction, and site remediation applications. For the material handling systems, conservative design features have been provided in specification of excavation equipment, rates, methods, and operating schedules. These are discussed as follows:

> Design Rate - The design rate of 3,900 LCY/shift is conservative. Based on the probable contamination volume, the required average rate is about 2,400 LCY/shift (see Section 4.7.2.2). The difference between average rate and design rate is about 62%.

Equipment Production Rates - Equipment cycle times (individual equipment production rates)(see Section 4.3) have been conservatively specified assuming unfavorable conditions. Examples are listed as follows:

- Medium to difficult digging conditions are assumed for specifying excavator cycle times.
- Hard to drift/non-cohesive material is assumed for dozer specification; in addition, the production rates for the dozer/loader combination are reduced by 20% to account for unexpected delays.
- Production of concrete demolition operations is based on the lower end of the equipment ratings.
- Production of loading grapples assumes difficult excavating conditions; in addition, the equipment rates are reduced by 25% to account for unexpected delays.
- Production rates for small sites are reduced by 10% to account for unexpected delays.
- Burial ground excavation rates are reduced by 50% to account for unexpected delays or difficult conditions.

Conditions which are more favorable that those assumed will allow higher productivity than specified in the design.

Labor Productivity - Productivity is specified based on 5.25 productive hours per shift. This relatively low labor productivity is due to the requirements posed by working in radioactive contamination zones, i.e., the need for frequent changes into and out of protective clothing. This loss of productivity can be mitigated by providing additional relief workers to operate equipment during scheduled breaks. By providing one relief worker for every two regular workers, a full eight hours of production can be achieved in each shift (see Section 9.1.4 for derivation of these values). This could effectively increase productivity by about 50% for a one shift operation and 62% for a two shift operation.

Operating Schedule - The pre-design assumes operation on a two shift per day basis, five days a week, except for the first year, which operates on a one shift per day basis. Expanded productivity can be achieved by adding a third or even a fourth shift. Each additional shift expands productivity by 50% relative to a two shift operation. Thus it is possible to achieve twice the productivity by expanding the operations from a two shift per day operation to a four shift operation (three shifts per day, seven days a week).

Equipment and Labor Additions - Productivity increases are readily achieved by adding additional excavating equipment and the associated personnel to operate the equipment.

Achieving higher productivity in excavation operations is a stepwise process; successive steps are added until the desired production rate is achieved. Some steps are more cost effective than others. The expected increases in productivity are tabulated below. The steps are listed in order of preference.

	Productivity Multiplier
• Base = 2 shifts/day @5.25 productive hours per shift	1.0 = base
• Add relief personnel to increase the per shift operating hours	1.6 x base
• Add a third shift*	2.3 x base
• Add a fourth shift*	3.2 x base
• Add equipment and additional operating personnel.	Variable; depends on specific equipment added

* Includes relief personnel

7.2 TRANSPORT

Transport systems consist of containers, haul trucks, container handlers, and trains (railcars and locomotives). Specification of transport systems in the pre-design is conservative. Specific design features are discussed as follows:

Haul Trucks - The number of haul trucks (20) is conservatively specified assuming a maximum cycle time of 43 min for a truck and its container (holding contaminated material) to move through the classification structure, decontamination facility, survey station, container transfer area, and return to the excavation site. This cycle time will be shorter for some trucks which do not have to move through the classification structure. Also, specification of the survey cycle time (15 min) is conservative. It is anticipated that this time can be reduced to about three minutes. Any reductions in truck cycle times will allow higher transport rates.

Containers - The pre-design specifies the acquisition of 130 containers (see Section 6.2.4); at the design rate, approximately 105 containers are required, leaving about 25 as spares. This provides about 19% excess container capacity at the design transport rate.

Container Handlers - The pre-design specifies the acquisition of two container handlers for transfer of containers from the haul trucks to railcars. At the design rate, 108 containers will be transferred in a shift or about one every three minutes on the average. Each container handler can transfer a container in about two minutes. Thus with two container handlers, the handling capability is about three times the design requirement.

Trains - The pre-design specifies three trains of 15 cars per train for a total of 45 cars (see Section 6.2.3). At the design rate, 33 cars are required, leaving about 12 cars as spares (36% excess). In addition, the pre-design specifies round trip movement of 5 trainloads per shift. This allows 150 containers per shift to be transported, although the design rate only requires transport of 108/shift. Thus the excess capability is 42 containers per shift or 39%.

Based on the anticipated train cycle time (see Figure 4-7) six trainloads can be moved in a shift without additional equipment. This provides an additional 20% material transport capability.

Only one locomotive is required to move railcars to and from the ERDF. The pre-design specifies two locomotives, thus providing 100% excess capability.

Material transport capability can be increased in a manner similar to that discussed for expandability of excavation capability (Section 7.1). Adding relief personnel (to truck operating crews) and/or additional shifts would expand transport capability in the same proportion as assumed for excavation operations.

Additional expandability could be achieved by adding equipment, i.e., haul trucks, containers, container handlers, railcars and locomotives. Adding additional trains would require construction of additional sidings to allow trains to pass each other while en route.

7.3 MATERIAL STORAGE

Local spoil stockpile areas located adjacent to each waste site have been sized to receive clean material derived from excavation of overburden, ramps, and clean soil surrounding the contamination zones. Spoil stockpiles have been sized based upon the probable excavation volumes (see Attachment 1 (Volume 2)). In addition, a central spoil stockpile area is provided to store material which is derived primarily from the fringe areas surrounding the contamination zones (material which is classified clean in the classification structure). The central spoil stockpile area is oversized, in that it can store up to 50% of the total clean material generated. Total capacities are tabulated as follows:

Local spoil stockpiles	1.4 million LCY
Central spoil stockpile	0.8 million LCY
Total spoil storage	2.2 million LCY.

Size of the spoil stockpiles are based on a height of 4 m which can be achieved by pushing the material with the bulldozer in one lift. If necessary, additional height (and thus additional storage) could be achieved by constructing ramps on the piles and placing additional lifts of material on the pile. Alternatively, the piles can be increased in height by using a conveyor stacker.

The pre-design considers the location of local spoil stockpiles such that the piles can be expanded laterally in size, if necessary. The central spoil area can be doubled in size by expanding it to the north of its currently specified location (see Drawing H-1-80224).

7.4 TREATMENT

About 45,000 m^2 (approximately 11 acres) is specified in the pre-design as a reserved plot area for waste treatment, if required. This is a large area and would accommodate an operation of substantial size involving multiple activities. Should space be required beyond this, ample space for expansion is available to the north of the north leg of the existing rail spur (see Drawing H-1-80224).

7.5 SUPPORT SYSTEMS

7.5.1 On-Site Systems

On-site support systems consist of activities and their associated areas and or facilities which are provided within the 100 B/C site to support excavation, analytical, and transport operations. Expandability of each system is discussed below.

Office area - The office area contains trailers and an employee parking area. Total plot space reserved for the office area is approximately 15,000 m^2 (about 4 acres)(see Drawings H-1-80224 and H-1-80239). Office facilities are easily expanded by adding more trailers.

Change facility - The change facility is included in the office area and consists of trailers. The change facility is designed to handle the maximum number of shift workers (see Section 9.2) assuming that all the workers in a single shift use the change facility at the same time. The first and second shifts overlap so that two shifts do not use the facility at the same time. The number of lockers provided is assumed based on two shifts of workers plus twenty percent. Expandability can be gained by staggering shift starting times and/or adding additional trailers.

Personnel decontamination stations - Two trailers are provided at opposite ends of the site. Each trailer is designed assuming that breaks are staggered in a manner such that only ten workers move through the decontamination lines at any given time. Two lanes are provided in each trailer. Expandability can be gained by further staggering break times and/or adding additional trailers.

Analytical Services - Approximately 800 m^2 (about 0.2 acres) (see Drawing H-1-80224) is reserved for on-site labs. All on-site labs will be provided in trailers which can be expanded by adding additional trailers. Additional plot space is available in the area surrounding the designation location for the on-site labs.

Equipment staging - A plot space of approximately 99,000 m^2 (about 25 acres)(see Drawing H-1-80224) is reserved for equipment staging and maintenance. This plot space should be adequate for any foreseeable expansion.

Decontamination facility - The decontamination facility includes one automated wash station and a manual wash backup. At the design rate, 108 trucks move through the decontamination facility in a shift. This averages to about one truck every three minutes. Because each truck is washed in about one minute, the capacity is about three times the design rate. The manual wash system is designed to wash about 6 trucks per hour or 30 in a shift and is intended to be used infrequently.

In the event of failure of the automated system, the manual system is used until the automated system can be brought back on-line. Manual system capacity is expanded by bringing in additional portable units as required to maintain container throughput.

Container classification - At the design rate, 63 containers move through the classification structure in a shift. This equates to an average of about one container every five minutes. Each container is estimated to require about two minutes to move through this station. In addition, two bays with separate instrumentation packages are provided. Therefore, with both bays operating, the classification structure can handle five times the design throughput of containers.

Container surveying - At the design rate the survey station(s) must handle 108 containers per shift or about one every three minutes on the average. It is estimated that each container will require about three minutes to survey. Because two parallel surveying stations are provided, twice as many containers can be handled in a shift. Expandability is achieved by adding additional surveying stations. This is easily achievable since surveying consists primarily of technicians using hand-held instruments.

Container transfer area - Container handlers are discussed in Section 7.2.

The container transfer area provides space for storing 60 containers or about 57% of the entire container inventory. At the design rate, the maximum number of containers which could be in interim storage at any given time is 40 containers (based on the assumption of a two hour holdup for analytical results). Interim storage expandability is easily and quickly achieved because there is ample plot space available for many more containers.

Utilities - The potable water treatment provides about 15,000 gal/day capacity, which is adequate to handle the anticipated number of on-site workers. The system is expandable by adding additional skid-mounted package treatment units.

The sanitary waste system is designed to provide capacity of about 13,000 gal/day of sanitary waste. Waste is collected in holding tanks and periodically pumped into trucks. Expandability is gained through more frequent pumping of the tanks or through addition of holding tanks.

The electric lines serving the 100 B/C Area are capable of handling loads much larger than required for the remedial systems. Expandability can be gained by adding more tie-in points and/or more distribution stations (transformers and switchgear).

7.5.2 Off-Site Services

The pre-design assumes that all off-BC-site services are supplied primarily by existing Hanford organizations. It is further assumed that adequate capacities will be available during the required time frame to meet the project requirements. An in-depth analysis of these services has not been performed; it is recommended that this be completed in the definitive design phase. Expandability of services is dependent upon the specific capacities of Hanford services which will be available during the remediation time frame; no specific problems are anticipated at this time.

8.0 SAFETY AND QUALITY ASSURANCE

This section provides a discussion of design issues relating to health and safety and quality assurance. The health and safety discussion provides a listing of documentation which is being prepared to address safety requirements, hazards classification, and safety analysis. The health and safety discussion also summarizes the engineered controls, administrative controls, and monitoring procedures which are specified in the design to assure a safe system. The quality assurance section defines the quality assurance requirements and documentation.

8.1 HEALTH AND SAFETY

Health and safety issues are addressed in a series of Westinghouse documents described in the *Nonreactor Facility Safety Analysis Manual* (WHC 1991g). This manual requires preparation of the following documents:

- hazards classification
- preliminary safety evaluation (PSE)
- preliminary safety analysis report (PSAR)
- final safety analysis report
- technical safety requirements.

Westinghouse Hanford Company has completed a hazard assessment (WHC 1992) and is currently preparing the PSE and a SEP for the bulk shipping containers. The PSE (WHC 1993a) is being prepared by Environmental Restoration Safety Support and was released in September 1993 in draft form. The SEP is being prepared by WHC's Packaging Safety Engineering group and is expected to be completed in FY 1994.

The protection of worker and public health and safety is a paramount concern. Health and safety is protected by evaluating the proposed activities, determining the associated risks, and designing controls to ensure worker, public, and environmental safety. These controls fall into three categories: engineered controls, administrative controls, and monitoring. Although monitoring is not actually a control, monitoring enables controls to be evaluated by indicating conditions such as contaminant concentrations and air quality. If conditions degrade and are no longer acceptable, work is stopped and the remedial procedures modified to more effectively control site hazards. Details of each type of control are discussed in the following sections.

8.1.1 Engineered Controls

Engineered controls consist of elements designed to limit or minimize the exposure of a worker or the public to the hazards at or originating from a site. These elements include equipment design, systems design, and physical structure/environment design. Engineered controls are the primary method of hazard control because they do not rely on operator compliance to be effective. These controls function because they confine the environment in such a way that the hazard or its affects are controlled. Table 8-1 presents the engineered controls used to mitigate specific hazards.

8.1.2 Administrative Controls

Administrative controls consist of procedures and work practices that limit the exposure of a worker or the public to the hazards at or originating from a site. These controls are secondary because they rely on personnel to properly follow procedures. The effect of the hazard is avoided only if the procedure is followed. Administrative controls are used when engineered controls are not available or impractical. Detailed procedures for the material handling operation will be developed after the final design is complete. However, some recommended work practices are identified at this stage of the design. These are presented in Table 8-2.

8.1.3 Monitoring

Monitoring is performed to ensure that engineered and administrative controls are effective (i.e., that the workers are not being exposed to hazardous conditions). The materials handling system includes monitoring for waste identification and worker safety. Table 8-3 lists the monitoring instruments and provides a brief statement of their target analytes, use, and application.

8.2 QUALITY ASSURANCE

In general, QA is achieved in accordance with the requirements of the WHC *Quality Assurance Manual* (WHC 1988b) as implemented by the *Environmental Engineering Technology and Permitting Function Quality Assurance Program Plan* (WHC 1990a). The activities associated with the 100 B/C Area are conducted in accordance with the standard operating procedures identified by WHC (1990a). Contracted activities, whether performed by another contractor or a non-Hanford contractor, will have a properly implemented quality assurance program appropriate for the identified tasks. Site specific quality assurance and quality control needs will be identified in a quality assurance project plan (QAPjP) for the 100 B/C Area project. The structure and content of the QAPjP are found in *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans* (EPA 1983).

This design project is conducted under the QA requirements specified in DOE Order 6430.1A, Section 0140. This document requires that design:

- ensure that the established program and project quality objectives are satisfied
- be developed and implemented in compliance with DOE Order 5700.6C and using applicable elements of DOE Order 4700.1 and American National

Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) NQA-1.

Based on these requirements, an adequate QA program provides the following assurances:

- Organizational interfaces are identified and controlled.
- The design's adequacy is independently verified.
- A document control system is in place.
- A change control system is in place.

Each of these requirements is addressed below.

Organizational Interface - The organizational interfaces are identified and described in Section 6.7.

Independent Design Verification - Verification of the design is the responsibility of WHC or their appointed agent. This preliminary design does not include an independent review.

Document Control System - As required in the statement of work, this project conforms to the WHC document control system. The design documents (including drawings) are released through the Westinghouse Hanford document control system (either under the *Document Control and Records Management Manual* (WHC 1988c) or the *Standard Engineering Practices* (WHC 1988d)) and thus meets those requirements. In addition, all design drawings are prepared in accordance with the WHC *General Design Criteria, Preparation and Control of Engineering and Fabrication Drawings* (WHC 1990b).

Change Control System - The *Document Control and Records Management Manual* and *Standard Engineering Practices Manual* (WHC 1988c, WHC 1988d) control changes to the design documents and drawings.

Table 8-1. Engineered Controls

Engineered Control	Hazard
Side slopes no greater than 1.5:1 (horizontal:vertical) and any excavations deeper than 20 feet must have side slopes designed by a professional engineer.	Cave-in due to unstable side slopes.
Mobile equipment, all portable structures, and offices have portable fire extinguishers. The site laboratory has a dedicated sprinkler system.	Fire damage and injury.
Excavation operations personnel use large equipment with long booms that physically removes them to a safe distance (12 ft or greater) from the excavation face.	Exposure to immediate excavation area where falling objects, fire, explosion, pressure release, radiation, or contaminant release may occur.
Waste shipping container uses gate latches and container lock-down devices which are remotely operated.	Exposure of operator to waste and proximity to operating excavators or container handlers.
Wipe test pads on long-reach poles	Radiation exposure of wipe-test personnel
Open excavation face and spoil stockpiles are sprayed with water when active and crusting agents are used to stabilize contamination during off-hours.	Radiation exposure to workers and public; minimization of contamination spread.
Equipment decontamination station is automated and enclosed in a metal building on a concrete pad.	Exposure of operator to airborne contaminated particulates; minimization of contamination spread.
Office area is located away from the excavations and haul roads and upwind (from the primary wind direction) of the waste sites.	Exposure of office personnel to airborne contaminated particulates.
Traffic patterns in the ancillary facility sections are separated (one-way traffic).	Minimize contact between vehicles carrying contaminated material and vehicles carrying empty containers.

Table 8-2. Administrative Controls

Administrative Controls	Hazard
Personnel are required to shower before eating and before leaving the site.	Ingestion or spread of contaminants.
Site personnel working within the exclusion area must wear one layer of protective clothing (whites) over their work clothes, shoe covers, and two pairs of gloves (inner and outer gloves appropriate for the existing chemical and/or radiological hazards).	Skin exposure to radiological and/or chemical contamination.
Site personnel working in areas with sufficient potential for airborne contamination wear air purifying or supplied air respirators. Personnel using supplied air also have a five minute escape system for emergency air supply if the primary air supply fails.	Inhalation exposure to radiological and/or chemical contamination.
Vehicle positions are monitored at all times and a vehicle without a reason for entering contaminated areas, or storage areas, will be warned of the violation by the command and control system (part of the data acquisition system).	Exposing vehicles and personnel to unnecessary hazardous conditions or potential contamination of an uncontaminated area.
All container transactions are verified by the data acquisition system to ensure that the container is transferred to the correct location. Incorrect transaction warnings are transmitted to each party and the site controller.	Spread of contamination to areas not designated for the material.
Exclusion and support zones are separated by barriers and marked with signs.	Exposure of personnel to unnecessary hazards.

Table 8-3. Monitoring Activities

Instrument	Target Analytes	Use	Application
High volume air sampler	Total/respirable dust, airborne radionuclides	Automatic, filters changed each shift	Contamination control, health and safety
Field GC/MS	Airborne organic contamination	Automatic, reports airborne organic concentrations	Contamination control, health and safety
Excavation monitoring system	Radionuclides, total organic (VOC and SVOC), and total metal concentration	Manual, waste classification and designation.	Operational control, contamination control, and health and safety
Soil moisture and density	Soil moisture level and soil density	Manual, waste classification and designation (required to support the excavation monitoring instruments)	Operational control, contamination control, and health and safety
Personal dosimeter	Radiation exposure	Passive, personal radiation exposure level	Health and safety
O_2/Explosivity meter	O_2 and flammable organic concentrations	Manual, determine if field oxygen and explosivity conditions are acceptable for work	Health and safety
Surface wipe tests	Removable radioactive contamination	Manual, determine if containers are acceptable for transport	Health and safety and contamination control
Container monitoring system	Radionuclides, total organic (VOC and SVOC), and total metal concentration	Manual, waste classification and designation.	Operational control, contamination control, and health and safety
Closure monitoring system	Radionuclides, total organic (VOC and SVOC), and total metal concentration	Manual, site classification and designation.	Verification of closure, contamination control, and health and safety
Container surface dose level	Radiation dose rate	Automatic, waste classification and to determine if container is acceptable for transport	Health and safety, operational control
GPS	Equipment and vehicle locations	Automatic, collision avoidance, flow control, determination of correct waste transfer, containers and vehicles travelling to correct locations, containers emptied at correct locations, containers filled from acceptable locations.	Health and safety, operational control, and contamination control
Information interrogation system	Container and rail car identification number	Automatic, tracking of containers from generation to final disposal	Health and safety, operational control, contamination control.
Container dump indicator	Trailer dump bed tilted above predetermined limit	Automatic, indication of container unloading	Health and safety, operational control, contamination control.
Load cell	Weight	Automatic, loading, lid placement or removal, and container removal.	Health and safety, operational control, contamination control.

9.0 PERSONNEL REQUIREMENTS

This section discusses personnel scheduling (Section 9.1) and provides estimates of labor force requirements (Section 9.2).

9.1 PERSONNEL SCHEDULING

Personnel scheduling scenarios are developed to ensure a level of productivity which satisfies the requirements of the pre-design guidance (WHC 1993a) and which optimizes equipment utilization. The scheduling scenarios are developed based on a one-shift-per-day operation in the first year and a two-shift-per-day operation in subsequent years. The scenarios define the productive and non-productive time as well as equipment down time.

9.1.1 Criteria and Assumptions

Section 3 of the pre-design guidance (WHC 1993a) states that for design purposes, 5 hours of productive work are to be assumed per 8 hour shift. In this pre-design, excavation productivity is based on seven 45 minute periods for a net shift productivity of 5.25 hours (see Section 4.3.5).

Non-productive time is primarily a result of the frequent clothing changes and decontamination required for working in radioactive contamination areas and for breaks. Development of the scheduling scenarios is based on the following assumptions:

- The non-productive time includes personal protective equipment donning and doffing, travel to and from the excavation sites, decontamination, and breaks.
- For the one-shift scenario, all time spent not working is considered equipment downtime.
- For the two-shift scenario, the end of the first shift and the beginning of the second are not considered equipment downtime because the shifts are overlapped.
- Rest breaks are taken at each decontamination trailer location.
- The lunch break is taken at the 100 B/C office area.

9.1.2 Activity Durations

Assumed activity durations are listed in Tables 9-1 for the one-shift scenario and Table 9-2 for the two shift scenario. The listed activities are defined as follows:

Dress-undress - change between work and civilian clothing

Travel to and from the excavation - transport workers from the change facility to the individual excavations sites. "Clean" transport vehicles (vans) are used to transport workers between the change facility and the excavation sites; "regulated" vehicles are used within the exclusion area for travel between excavation sites on potentially contaminated haul roads.

Don PPE - changing into anti-contamination clothing and respiratory protection equipment

Work - periods of time when workers are performing their assigned tasks

Decontamination - removal of anti-contamination clothing and respiratory protection equipment for site exit

Survey - whole body survey to ensure effective personnel decontamination

Break - rest period to allow relief from work in anti-contamination clothing and respiratory equipment; also used for bathroom usage and water consumption

Lunch - break at mid-shift for eating lunch at the 100 B/C office area

Shower - required by OSHA regulations for all site workers before leaving a hazardous waste site.

9.1.3 One-Shift Scenario

Table 9-1 defines the breakdown of activities for a given shift. The shift begins at the change facility, includes a morning break, a break for lunch, an afternoon break and an end of shift change out. All non-work activities are considered equipment downtime. Productive work periods total 320 minutes or 5.3 hours. This meets the productivity requirements assumed in developing excavation schedules.

Equipment downtime for the one-shift scenario is 160 minutes, or about 33% of the 8 hour shift.

9.1.4 Two-Shift Scenario

Table 9-2 defines the breakdown of activities for each shift; a schedule similar to the one-shift scenario is assumed. The productivity remains at 5.3 hours per 8 hour shift; however, equipment downtime is reduced due to the one-half hour shift overlap. This overlap occurs at the end of the first shift and the beginning of the second shift. This is achieved by the second shift being prepared to work as soon as the first shift is ready to begin decontamination. This allows the equipment to be utilized continuously through the end of the first shift and into the beginning of the second shift. Equipment downtime improves from about 33% in the one-shift scenario (Table 9-1) to about 28% in the two-shift scenario (Table 9-2).

9.1.4 Alternatives for Productivity Improvement

An alternative personnel scheduling scenario is proposed to improve equipment utilization further and increase production. This alternative involves using additional workers to relieve operations personnel during breaks and lunches. This would allow the equipment to remain operating during breaks thus minimizing downtime. Relief requirements consist of 25 minutes for each break and 115 minutes for lunch during each shift. Thus the total relief for each individual for each shift is 165 minutes. Because each individual works 320 productive minutes (Table 9-1), a relief person can relieve 1.9 workers (320/165). Therefore, with a 53% increase in staff (1/1.9 = 1.53), productivity in each shift can be increased to a full 8 hours.

This alternative is not reflected in the baseline design or the cost estimate presented in this report. It is presented only as an alternative for consideration in future design phases.

9.2 LABOR FORCE ESTIMATES

This section discusses labor force requirements for staffing excavation, transport, and associated operations within the 100 B/C Area. Estimates are provided only for those personnel who directly support operations. Support services provided by other Hanford organizations or organizations outside of Hanford are not included in the estimates. Although the analytical system is not within the scope of this material handling pre-design, personnel associated with analytical systems are included within these labor force estimates, because total staffing requirements are necessary to specify support systems such as utilities, change rooms, offices, and laundry requirements.

9.2.1 Activity-Specific Personnel Requirements.

Personnel requirements are divided into the following categories:

- excavation operations - includes all excavation operators and analytical personnel supporting excavation operations
- transport operations - includes all personnel associated with container transport, classification, surveying, decontamination, and rail transfer
- reclamation operations - includes personnel associated with site backfill and restoration operations

- office support - includes on-BC-site general management and administrative support personnel

- miscellaneous - includes personnel for equipment maintenance, road maintenance, storage pile maintenance, sample transport, and miscellaneous laborers.

Staffing assumptions for each of these categories are discussed in the subsections below. The labor force estimates are tabulated in Table 9-3.

9.2.1.1 Excavation Operations.

- Excavation crew - for each excavation site the crew consists of:
  - one equipment operator for each equipment unit (e.g., excavator, dozer)
  - one laborer
  - one health physics technician
  - one-half field team leader (FTL); the FTL oversees excavation operations for the site.

- In situ analytical - for each excavation site, the crew consists of:
  - one monitoring vehicle operator
  - one sampler
  - one health physics technician
  - one-half field team leader; the FTL oversees in situ analytical operations for the site.

- Site safety and quality assurance - consists of one site safety officer (SSO) who is responsible for all safety and quality assurance concerns for the 100 B/C area.

- Dust suppression - one worker who is responsible for dust suppression operations at the site.

9.2.1.2 Transport Operations.

- Truck drivers - consists of one driver per truck for hauling containers.

- Waste classification structure - consists of:
  - one sampler
  - one classification system operator.

- Lid placement and removal - consists of one fork-lift operator to place and remove lids from containers.

- Container decontamination - consists of one worker to operate both the automatic and manual decontamination units.

- Container survey - consists of:

  - three health physics technicians performing container surveys
  - one worker for guiding the trucks through the survey station.

- Container transfer - consists of:

  - two workers operating container handlers; although only one container handler is operating at a time, one of the workers is provided as a relief person to maintain continuity of this operation.

9.2.1.3 Reclamation Operations. A staff of ten workers are provided to perform the site backfill operations as follows:

- three compactor operators
- one bulldozer operator
- one loader operator
- two scraper operators
- one foreman
- two water truck drivers for dust suppression.

9.2.1.4 Office Personnel. A small staff of workers are engaged in general management and administrative support activities. These workers are provided with offices in the 100 B/C office area and are not normally assigned to full-time operations within the exclusion zone.

- Area supervisors - consists of workers responsible for BC areawide operations as follows:

  - one construction supervisor - oversees all excavation operations
  - one transport supervisor - oversees all container handling and transport operations
  - one health physics supervisor - oversees all health physics technician (HPT)
  - one area site safety supervisor - oversees all safety and quality assurance activities
  - one project manager - oversees all remediation operations.

- Engineering - consists of:

  - four cognizant engineers who provide technical support to individual site operations
  - one engineer for control and coordination of overall site activities.

- Clerical - consists of one worker providing clerical support for the office staff.

- Network administrator - consists of one individual for management and coordination of the computer system and local area network activities.

9.2.1.5 Miscellaneous.

- Equipment maintenance - consists of eight maintenance craftsman who are responsible for the maintenance of all excavation equipment, haul trucks, containers, and other vehicles. The crew consists of:

  - three oilers
  - four mechanics
  - one tire person.

  Maintenance occurs both on the productions shifts(s) and on the off-shift(s).

- Sample transport - consists on one worker responsible for pick-up and delivery of all samples generated at the excavation sites destined for the on-site lab; also, responsible for delivery of sample containers and supplies at the sites.

- Storage pile maintenance - consists of two workers responsible for management of all clean soil storage piles;

  - one worker operates a bulldozer at the central storage pile
  - one worker operates a bulldozer at all of the active local storage piles

- Road crew - consists of two individuals responsible for the maintenance of all haul roads, including road grading and dust control; also, responsible for dust control at the storage piles

- Rail crew - consists of three locomotive operators and one rail broker who ensures that the rail shipment is secure and prepared for transport

- Laboratory - consists of ten individuals performing sample analysis

- Miscellaneous laborers - consists of three workers with miscellaneous duties such as delivering parts and supplies to maintenance mechanics and transporting personnel or equipment. One of the crew members will be responsible for contamination surveys on the haul roads.

- Medic/First Aid - consists of two individuals to provide emergency medical assistance for the 100 B/C site.

9.2.1.6 Off-shift Personnel.

A third shift will be employed for the routine road and equipment maintenance required by the project. This shift will also be responsible for spoil stockpile stabilization and remote water supply replenishing.

- Equipment maintenance - consists of the same crew identified in section 9.2.1.3 that will be responsible for the routine maintenance of trucks and heavy equipment.

- Road crew - consists of four individuals responsible for filling potholes, regrading and sealing roadways as necessary. The crew consists of:

  - one scraper operator
  - one compactor operator
  - one water truck driver
  - one gravel truck driver/pothole filler.

- Decontamination waste removal - consists of one individual responsible for pumping out the sludge from the equipment decontamination station waste tanks as well as the waste holding tanks for the personnel decontamination trailers.

- Water refill - consists of one individual responsible for refilling all remote water tanks on the site. Duties also include stabilizing all waste site excavations and spoil stockpiles with a crusting agent to prevent wind generated dust.

- Health physics technician - one individual responsible for the personnel surveys as well as other equipment surveys as necessary. The individual will also operate the contamination survey equipment for the roadways.

- Supervisor - one individual responsible for the supervision of the shift personnel.

9.2.2 Estimate Summary

A summary of labor force requirements for all activities at the 100 B/C Area is given in Table 9-3.

During the first phase of the project (FY 1997), one shift of workers is employed along with off-shift maintenance personnel. A total of 125 workers perform the on-shift tasks, and 16 individuals perform the off-shift tasks. This equates to a total of 141 employees for the first year of operation.

The second phase of the project (FY 1998 to 2001) employs two shifts and assumes the same off-shift crews for general maintenance. In the two-shift scenario, 250 workers are employed (125 each shift) along with 16 workers performing the off-shift activities. This equates to a total of 266 employees for the second phase of the project.

Table 9-1 Personnel Scheduling for a One-Shift Operation

Activity	Shift 1, min
dress-undress	10
travel to excavation	5
don ppe	10
work	80
decon	4
survey	1
break	10
don ppe	10
work	80
decon	4
survey	1
travel to change facility	5
shower	10
dress-undress	10
lunch	60
dress-undress	10
travel to excavation	5
don ppe	10
work	80
decon	4
survey	1
break	10
don ppe	10
work	80
decon	4
survey	1
travel to change facility	5
shower	10
dress-undress	10
TOTAL	540

Total time for each activity		
activity	minutes	% of shift
dress-undress	40	8.3
travel	20	4.2
don ppe	40	8.3
decon	16	3.3
survey	4	0.8
shower	20	4.2
break	20	4.2
TOTAL non-work	160	33.3
work	320	66.7
shift	480	100.0

Equipment down time over one shift		
activity	minutes	% of shift
Begin shift	25	5.2
Break 1	25	5.2
Lunch	55	11.5
Break 2	25	5.2
End shift	30	6.3
TOTAL	160	33.3

Table 9-2 Personnel Scheduling for a Two-Shift Operation

Activity	Time in minutes Shift 1	Shift 2
dress-undress	10	10
travel to excavation	5	5
don ppe	10	10
work	80	80
decon	4	4
survey	1	1
break	10	10
don ppe	10	10
work	80	80
decon	4	4
survey	1	1
travel to change facility	5	5
shower	10	10
dress-undress	10	10
lunch	60	60
dress-undress	10	10
travel to excavation	5	5
don ppe	10	10
work	80	80
decon	4	4
survey	1	1
break	10	10
don ppe	10	10
work	80	80
decon	4	4
survey	1	1
travel to change facility	5	5
shower	10	10
dress-undress	10	10
TOTAL	540	540

Total time for each activity		
activity	minutes	% of shift
dress-undress	40	8.3
travel	20	4.2
don ppe	40	8.3
decon	16	3.3
survey	4	0.8
shower	20	4.2
break	20	4.2
TOTAL non-work	160	33.3
work	320	66.7
shift	480	100.0

Equipment down time over two shifts		
activity	minutes	% of shifts
Total time for 2 shifts	960	
Begin shift 1	25	2.6
Break 1 shift 1	25	2.6
Lunch shift 1	55	5.7
Break 2 shift 1	25	2.6
Break 1 shift 2	25	2.6
Lunch shift 2	55	5.7
Break 2 shift 2	25	2.6
End shift 2	30	3.1
TOTAL	265	27.6

Shaded areas are shift overlaps not included as down time

Table 9-3 Labor Force Estimate for the 100 B/C Project

Activity	Number of Workers For One Shift Operation	Number of Workers for Two Shift Operation
ON-SHIFT PERSONNEL*		
EXCAVATION OPERATIONS		
Excavation crew	18	36
In situ analytical	14	28
Site safety and QA	1	2
Dust suppression	4	8
Subtotal	37	74
TRANSPORT OPERATIONS		
Truck drivers	20	40
Waste classification	2	4
Lid placement/removal	1	2
Container decontamination	1	2
Container survey**	8	16
Container transfer	2	4
Subtotal	34	68
RECLAMATION OPERATIONS		
Backfill/regrading crew	8	16
Dust suppression	2	4
Subtotal	10	20
OFFICE PERSONNEL		
Area supervisors	5	10
Engineering	5	10
Clerical	1	2
Network administrator	1	2
Subtotal	12	24
MISCELLANEOUS		
Equipment maintenance	8	16
Sample transport	1	2
Storage pile maintenance	2	4
Road crew	2	4
Rail crew	4	8
Laboratory	10	20
Miscellaneous laborers	3	6
Medic/First Aid	2	4
Subtotal	32	64
SUBTOTAL ON-SHIFT PERSONNEL	125	250
OFF-SHIFT PERSONNEL		
Equipment maintenance	8	8
Road crew	4	4
Decontamination waste removal	1	1
Water refill	1	1
Health physics technician	1	1
Supervisor	1	1
Subtotal	16	16
TOTAL ON- AND OFF-SHIFT	141	266

* Based on four simultaneous excavation operations
** Based on two survey stations operating simultaneously

10.0 COST ESTIMATE AND SCHEDULE

10.1 COST ESTIMATE

The cost estimate for the 100 B/C remediation project is given in Attachment 2 (Volume 3). The estimate includes all capital and operating and maintenance (O&M) costs associated with the material handling and transport portions of the project. The estimate does not include costs associated with:

- the analytical system (including equipment, field and laboratory personnel, and analytical operating costs)
- disposal of waste at the ERDF.

The general cost estimating approach is summarized as follows:

- The estimate is prepared using the Micro-Computer-Aided Cost Estimating System (MCACES) developed for the U.S. Army Corps of Engineers.
- Written cost quotations are obtained for all major cost items; where vendor quotes are not used, the cost data are obtained from the MCACES database.
- All mobile equipment (excavation equipment and haul trucks) are procured on a lease to own basis such that payments are distributed over the years that the equipment is required.
- Field operations are subcontracted; operating costs are paid only for work performed and for downtime due to weather delays and training.
- Existing WHC services are used where available (see Section 6.6.2).
- All costs are reported in third quarter 1993 dollars.
- No escalation or contingency factors are added.
- Estimate accuracy is judged to be $\pm 15\%$.

The base assumptions used to create the cost estimate are presented in Table 10-1. Additional details on assumptions are given as notes in the cost estimate

Costs by FY are summarized as follows:

Fiscal Year	Cost in $ Million			
	Capital	Expense	O&M	Total
1996	17.6	0.5	<0.1	18.1
1997	4.0	2.3	8.1	14.4
1998	6.9	4.0	16.4	27.3
1999	6.8	4.0	18.0	28.8
2000	7.9	4.0	18.1	30.0
2001	8.8	4.0	13.2	26.0
TOTAL	52.0	18.8	73.8	144.6

Total cost is about $73/LCY of contaminated material removed from the 100 B/C Area and transported to the ERDF.

10.2 PROJECT SCHEDULE

The project schedule defines major tasks and durations for all activities associated with the material handling and transport system operations. The schedule is depicted on Drawing H-1-80250. The project schedule begins at vendor receipt of purchase orders (PO) for long-lead equipment items and ends at the completion of final demobilization (project closeout). The major tasks are listed below:

- PO to vendors for long-lead items
- mobilization and construction
- remedial action
- interim and final site closure
- reclamation
- demobilization
- project closeout
- project completion.

A detailed discussion of these tasks is given below.

PO To Vendor - A milestone is identified for each FY defining the date at which the vendor must receive approved purchase orders to maintain the project schedule. The milestone date is defined as the date required that equipment is required in the field minus two months for readiness review minus the longest lead time for that group of purchases. Lead times are defined in Appendix C for all major equipment items.

Mobilization - Mobilization includes site preparation, road construction, facility construction, and security fence replacement. These activities must occur during FY 1996.

Remedial Action - The remedial action activity line summarizes the site excavation durations defined on the sequence plan in Drawing H-1-80222, Sheet 1 and discussed in Section 4.7. Activities in this task category also include the daily operations and maintenance items associated with the project.

Interim and Final Closure - Activities include interim waste site closure prior to the reclamation activities and final closure of the CERCLA site (see Section 5.0).

Reclamation - Includes reclamation activities such as backfill, regrade, and revegetation. Backhaul of material removed from the ERDF is considered only as a contingency option. All activities must be completed by the end of FY 2001. Sections 5.1 and 5.2 discuss these items in more detail.

Project Closeout - Includes dismantling of all remedial systems and facilities and prepares for their transfer to the next remediation site. Section 5.3 discuss these items in more detail.

Project Completion - The completion of the project, through final closure documentation, is indicated on the schedule by a milestone.

Table 10-1. Base Assumptions for the 100 B/C Material Handling Cost Estimate

Number	Assumption
1	Cost of money is 8.1% (annual percentage rate).
2	Operating crews are paid for 50 days per year during which no work is performed due to weather.
3	Operating crews are paid for 20 days in the first year during which no work is performed due to learning curve inefficiencies.
4	Davis-Bacon wage rates (general decision number WA930009) are assumed for contractors and WHC FY 1993 average labor rates are assumed for work performed by WHC.
5	All crews except excavation equipment operators and truck drivers are paid for eight hours per shift and 250 days per year.

11.0 ADDITIONAL WORK

This section identifies additional data needs and/or evaluations which should be performed prior to or during the definitive design phase. The discussion includes only those areas relating to design and specification of the 100 B/C remedial system. Programmatic issues such as regulatory and decision documentation requirements are not addressed here. Also, the discussion is limited to data/evaluation needs that relate to the material handling system; information that relates to the analytical system will be addressed as part of the analytical system development, which is being documented separately.

11.1 EXISTING CONDITIONS

Additional evaluations are needed to assess impacts of 100 B/C remediation on cultural resources and potential endangered/threatened wildlife. In addition, certain material property information is needed to support detail design of remedial systems. Additional surveying is needed to verify site locations and establish new control points. Recommendations are discussed in the subsections below.

11.1.1 Cultural Resources

Section 3.9 discusses archaeological artifacts that have been discovered in and near the 100 B/C Area. It is recommended that the significance of all sites discovered be evaluated prior to site remediation. It is also recommended that the proposed site remediation work be reviewed by the HCRL and DOE to determine whether plans have to be adjusted to avoid unnecessary impacts.

11.1.2 Area Wildlife

Wildlife surveys have been conducted on an area-wide basis (see Section 3.8.2); no specific surveys have been performed in the 100 B/C Area. A site-specific survey should be completed prior to start of remediation to identify sensitive habitats, if any.

11.1.3 Material Properties

Section 3.7.5 discusses material properties. Material property data gaps are listed as follows:

<u>soil size analysis</u> - only one size analysis is available and the original source is not clear. Additional analyses are needed to verify size distribution.

<u>soil bulk density</u> - direct bulk density measurements (dry and saturated) are needed for estimates of material weight.

slope stability parameters - data are required for soil shear strength (soil cohesion and internal friction) and soil water content.

soil angle of repose - for design of storage piles, angle of repose data should be obtained (dry and saturated conditions).

other soil properties - for backfill compaction requirements, data are needed on: maximum dry density and optimum water content as determined by Proctor density testing and in situ bulk density and natural moisture content as target values for recompaction.

11.1.4 Site Location and Surveying

Several site locations are not known with sufficient confidence to begin remedial operations. Location confidence is discussed in Section 3.1.3. Some sites whose locations are designated as "not confident" (see Table 3-2) are recommended for additional site walks in an attempt to locate surface features which may provide clues in locating the sites. Failing this, additional work is discussed in Section 6.1.2 (part of the analytical plan) which involves pre-excavation monitoring and analysis to locate sites. This work consists of geophysical monitoring and/or overburden gridding.

Additional survey work is needed prior to initiating the final design for the 100 B/C Area remedial activities. The work is needed to verify the map which has been used as a base for all the drawings in this preliminary design, to locate and mark the waste sites, and to locate and mark active utility systems.

The 100 B/C Area was originally laid out on a planar grid known as the Hanford Local Coordinate System. Errors have been found in the locations of many of the facilities at the site that were surveyed based on this system. The Washington State Plane Coordinate System is presently being used. The map used as a base in this design (Drawings H-13-000101 to H-13-000106) was derived from 1990 photogrammetry. The methods for compiling the map were not documented and no field verification was performed; thus the map is considered unreliable for continued use without additional verification. Therefore, prior to the initiation of final design work, it is recommended that the map be field verified. To verify the existing map, it is recommended that a Professional Land Surveyor survey the site and make needed adjustments to the map. The survey should be performed using conventional techniques and should include traverses of the mapped area and point surveying of the existing above ground facilities (buildings, utility lines, roads, etc.).

The locations of the waste sites shown on the preliminary design drawings were obtained from air photographs, field observations, plant drawings, or from previously reported coordinates (see Section 3.1.3). Mapping of waste site locations was performed by scaling from photographs or through correlation with mapped features. Coordinates obtained from plant drawings and previous reports were converted from Hanford Local Coordinates to state plane coordinates. As a result, inaccuracies may exist in the waste site positions plotted on the new drawings. Prior to final design work, it is recommended that all waste sites be surveyed and marked in the field. Survey monuments will either delineate the waste site boundary, in the case of sites with high location confidence, or will mark the initial points at which more detailed analytical based surveys can begin. Above ground waste sites, e.g. 116-C-5, should be located as part of the base map verification.

Active systems have been mapped in the same manner as the waste sites. Above ground facilities were located as part of the base map compilation and should be verified as part of the field verification. Below ground active facility locations will also need to be verified. The location of underground lines will require the use of geophysical techniques in conjunction with standard surveying methods. At this time, the export water line and fire lines which will need to be kept active are the only below ground lines which require accurate location. Line locations and invert elevations should be determined in the area where support facilities will be located and where lines interfere with the waste site excavations.

11.2 PROGRAM INTERFACES

A working relationship between the ER and D&D programs needs to be established to coordinate plans and schedules involving activities in the 100 B/C Area which may coincide or overlap. Consideration should be given to the integration of activities, equipment, and facilities to avoid duplication and to gain further increases in overall efficiency.

11.3 EXCAVATION STRATEGY

With additional work, further refinements are possible in excavation sequencing to optimize use of resources and minimize cost. Additional work is also needed to define and manage excavation interferences.

11.3.1 Sequencing

Section 4.7 develops criteria for excavation sequencing and defines a plan based on those criteria. The resultant sequence is not optimized with respect to level loading of equipment resources. Additional refinements of the sequencing plan could also be made to consider level-loading with regard to waste production, i.e., maintaining a leveled rate of waste transport to ERDF. These refinements are complex and are appropriate for evaluation in the definitive design phase.

11.3.2 Interferences

In Section 4.6 a critical interference is identified where the export water line crosses the proposed pipeline excavation. Geophysical data are needed to accurately locate this water line. Additional work is then needed to develop a cost effective strategy for safely managing this critical interference.

Other active system interferences are identified in Section 4.6. More analysis will be required to assess the need for replacing destroyed groundwater monitoring wells. Detailed analysis is needed to evaluate rerouting or replacement of telephone trunk lines which are impacted by excavations.

11.4 CONTAINERS AND TRANSPORT

The following subsections discuss needs for further evaluations of container decontamination, container safety evaluation, and container surveying. Also discussed are items relating to truck cab air supply.

11.4.1 Container Decontamination Alternatives

In Section 6.2.1.2, it was suggested that alternatives be evaluated to mitigate a potential problem with high truck maintenance due to the frequent exposure of the trucks to wet conditions. Possible alternatives to be evaluated include:

- surveying the containers prior to washing; it is possible that containers may not need to be washed to meet the survey requirements
- design of trucks to withstand wet conditions
- design a container decontamination system where the containers are separated from the trucks and washed
- decontaminate container surfaces with devices which do not use water (e.g., dry vacuum systems).

It is anticipated that the effluent from the equipment decontamination facility will not contain contaminants at a level of concern (see Section 6.6.3.1); therefore, it may be used unconditionally for dust suppression requirements. Data from the soil washing treatability studies currently being conducted should be evaluated confirm this assumption.

11.4.2 Container Safety Evaluation

Section 6.1.1 provides a proposed container design. This proposed container design must be rigorously evaluated for compliance with all applicable requirements governing transport of radioactive materials. This evaluation will eventually be detailed in a SEP to be completed by WHC's Packaging Safety Engineering group. This evaluation will review the proposed preliminary design, prepare packaging design criteria, and produce the SEP report which will form the basis for definitive design of containers.

The preliminary design provides for remote handling of containers to comply with the principles of ALARA. However, the design specifies a lid latching system which is not remotely operated. Additional evaluation is required to:

- determine whether a positive lid latching system is required; it is possible that the lid can be adequately secured by its own weight

- if a lid latching system is required, evaluate alternatives for remotely operated latches.

11.4.3 Container Surveying

Estimates of time required for container surveying range from three minutes to fifteen minutes (see Section 6.3.1). It is desirable that container surveying time be kept to a minimum to assure optimum material flow through the system using a minimum of trucks and containers. The issue of container surveying should be further evaluated to identify strategies or equipment which minimize the surveying time.

11.4.4 Truck Cab Air Supply

Section 6.2.1.2 specifies that truck cabs must be capable of being fitted with HEPA filters to assure a clean air supply for the truck drivers (although HEPA filtration is not actually specified in the baseline design). HEPA filters are very expensive to maintain and monitor. It is probable that fugitive dust can be controlled such that HEPA filtration is not necessary. Also, other alternatives may be available to protect the truck drivers. This issue requires further analysis and evaluation.

This issue also applies to air supply for the excavation equipment.

11.5 SITE CLOSURE AND RECLAMATION

11.5.1 Site Closure Standards and Verification Requirements

Additional work is required to identify:

- closure definition and standards
- verification requirements
- closure procedure where complete remediation is not possible.

These issues will be addressed as part of the development of the analytical system.

11.5.2 Site Reclamation

Sequencing of backfill operations has not been performed; however, total durations are such that backfill is not expected to represent a critical path to completing 100 B/C remediation. It is recommended that further work be performed as part of the definitive design phase to sequence the reclamation operations in a manner similar to the excavation operations.

As an option to recontouring in the retention basin area, soil can be backhauled from the ERDF (see Section 5.1). A definitive evaluation of this option has not been performed. It is recommended that an analysis of this option be performed as part of the definitive design.

11.6 ANCILLARY SYSTEMS AND SUPPORT

Additional information is required in the areas of utilities and site services. The need for waste treatment is being evaluated as part of on-going studies associated with the ERDF.

11.6.1 Utilities

Additional analysis is required to define specific tie-in points for water supply and electrical service to the area.

The baseline design assumes portable generators to supply lighting for the excavations. Additional analysis should be performed to evaluate use of on-site electrical services to supply power to the excavation for lighting or other uses such as equipment heating.

Use of holding tanks for storage of sanitary waste will require a waiver from the Washington Department of Health (see Section 6.6.3.1).

11.6.2 Site Services

Adequate availability and capacity of Hanford Site services is assumed for the baseline design. More in-depth analysis is required to quantify and project these service capabilities for the actual time frame of remediation.

11.6.3 Treatment

Treatment is discussed in Section 4.2.5. No treatment needs have been identified to date. Evaluations are on-going to determine the need for treatment of wastes prior to their disposal at the ERDF. These studies along with continuing dialog and negotiations with the regulatory agencies will eventually determine treatment requirements, if any.

12.0 CONCLUSIONS AND RECOMMENDATIONS

This report provides a preliminary design of the material handling and transport systems for the application of the LSR approach to remediation of the 100 B/C Area. Based upon the design analysis performed as part of this work, it is concluded that the remedial approach described in this document is viable, provides a high degree of worker safety, and ensures long term protection of human health and the environment as a result of removing sources of contamination from within the vadose zone. Application of the LSR approach to 100 B/C remediation provides:

- an engineered "cradle to grave" approach to site remediation
- integration of remedial actions with existing programs
- elimination of costly and time-consuming site investigations through application of the observation approach.

Based upon the cost analysis, it is concluded that the LSR approach is cost effective. Systems and methods employed are based on current technologies; material handling and transport equipment are readily available commercially. Cost savings are achieved as a result of economy of scale, i.e., unit costs are reduced by using large-scale equipment and by conducting operations in a manner which emphasizes productivity, efficiency, and safety. Productivity, efficiency, and safety are key to the success of site remediation.

Use of the observation approach to site remediation allows focusing of dollars to cleanup rather than investigation. Cleanup of a single area accelerates the timetable for site release and return of the land for other uses.

While LSR is not the only approach to site remediation, it is the only approach which has advanced to the level of design definition provided in this report. Further design work and decision documentation are required before the 100 B/C project can be implemented. Further efforts are required to communicate the results of this pre-design evaluation and obtain a consensus from the stakeholders. It is recommended that these efforts commence as soon as possible to advance toward implementation of Hanford cleanup in a timely manner.

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APPENDIX A

SUMMARY OF THE PREVIOUS MACROENGINEERING STUDY

The macroengineering conceptual study focused on low technology, high volume throughput approaches including excavation with mining-size equipment; volatile organics removal by in situ soil venting; demolition and size reduction of structures and pipelines with hydraulically operated processors; minimal segregation and containerizing wastes for transport; rail transport for on-site disposal; and site restoration. The study also emphasized use of portable/transportable equipment and real-time instrumentation for rapid characterization of sites and wastes which are not adequately pre-characterized.

The objectives of the conceptual macroengineering remedial approach were:

- rapid excavation
- real-time characterization
- bulk containerization
- bulk transport
- minimize unit cost
- maximize safety.

The remediation concepts initially excluded more complex and expensive waste minimization processing schemes such as soil washing, incineration of combustible solid wastes, and size reduction of large objects for transport. Such processing schemes require further development and could be added in the future if the technical and economic benefits are justified.

The system proposed for soil excavation would use large earth-moving equipment such as tracked backhoes and front end loaders. Large off-highway dump trucks (75-85 ton capacity), such as are used in mining operations, would transport uncontaminated soil to on-site storage piles during the excavation of overburden. The sites would be excavated using backhoes and loaders. Contamination measurements using field instrumentation would be performed to determine the area to be excavated. Real-time measurements would consist primarily of measuring radioactive indicator contaminants. Dust would be controlled using water mists. Although the original study proposed portable structures for fugitive dust containment, a value engineering study (LATA 1992) was subsequently performed which concluded that excavation and material handling can be conducted safely in an open air environment without exceeding either on-site or off-site regulatory limits for spread of contamination. Safe side slopes would be maintained and ramps would be constructed for vehicle access.

The original study proposed that excavated soils be conveyed out of the containment structure into containers using portable conveyors. Solid waste and debris would be loaded directly into containers and the containers moved out of the excavation structure via container conveyors.

Excavation would proceed until all the contaminated soil met the cleanup criteria or until groundwater was reached. At the end of each working day, any open excavations would be stabilized for dust control by applying commercially available soil binding reagents.

The study proposed that all excavation equipment be conventional wheeled or tracked machines available commercially. All control cabs would be fully enclosed and modified to provide radiation protection and a continuous supply of clean breathing air.

A critical part of the 100 B/C excavation concept is the ability to characterize the site and the waste as excavation proceeds. Concurrent characterization would make maximum use of real-time field measurement instrumentation and techniques. Real-time analytical systems are provided for:

- definition of contaminant boundaries
- air monitoring for worker safety and environmental protection
- waste segregation and designation
- monitoring transportation systems
- compliance with waste disposal site acceptance criteria.

Sampling and analysis would be used for verification of real-time measurements and for site closure verification.

To achieve real-time characterization, a field instrument package mounted on a telescoping boom and operated from a truck or tractor would be used as excavation proceeds. The mobile instrumentation package would include some combination of radiation counting instruments and instruments to detect indicator chemicals.

To verify instrument measurements, a limited number of grab samples would be taken from the excavation and composited. Samples would be analyzed in a mobile laboratory using accepted EPA and radioanalytical methods and full QA/quality control (QC).

The 200 Area disposal site would require that delivered waste be segregated, at a minimum, according to its radiation level and TRU content, e.g., high activity and TRU waste would be segregated, transported and disposed separately from low activity, non-TRU waste. High activity is considered >200 mR/hr at the container surface and is the criterion for remote handling. Transuranic waste is waste containing >100 nCi/g total alpha. Uncontaminated soils, e.g., overburden, would be kept segregated from contaminated soils and stored on-site in a staging area for use as excavation backfill.

No sorting of buried wastes would occur except for the purposes of defining contamination levels, with the exception of intact buried drums. Intact drums would need further inspection to determine whether they contained organic chemicals requiring further processing. Intact drums would be excavated, set aside, and further handled "off-line" to avoid excavation delays.

Steel retention basins and concrete structures, such as retention basins, tunnels and outfall structures, require extensive dismantling and demolition prior to removal to the 200 Area. Demolition tools would consist of hydraulically-operated processors attached to and operated from excavator or backhoe booms. Processors with plate shears would dismantle tanks to sizes appropriate for loading into the transport containers. As tanks are dismantled, steel scrap would be loaded with continuous rotation grapples designed for handling bulky, irregular shaped objects. Concrete pulverizer or cracking jaws and/or hydraulic hammers would be used to demolish concrete.

Large diameter (<24 inches) steel pipelines would be cut to lengths transportable by rail on racks on the flatbed cars. Small diameter pipelines would be excavated, cut, and transported to the 200 Area via shipping containers.

All excavated waste would be transported by rail to the 200 Area disposal site in bulk. Low activity waste would be transported in reusable, steel containers of approximately 50 cubic yards internal volume. High activity waste would be transported in non-reusable, steel containers which are about half the size of the low activity container. All containers would be filled directly at the excavation site. Containers would be moved to the container transfer stations by crane or truck. Containers would be lifted using cranes and secured on the flatbed railcars using commercially available locking devices.

Container overpacks would be provided for shielding of high activity containers during transport. Low activity containers would be provided with non-shielded overpacks to avoid the need for decontaminating exterior surfaces. Overpacks consist of an oversize steel box slightly larger than the shipping containers. All sides of the shielded overpack would be lined with lead.

Large diameter pipe would not be containerized unless contamination exceeded the activity criteria. This type of pipe would be shipped via railcars on covered racks. To reduce waste volume, the pipe would be flattened at the disposal site using a large compactor such as used for flattening old cars.

Upon completion of remediation, sites would be restored in a manner which did not impact ongoing excavation and demolition work at adjacent sites. The site restoration process would consist of the following steps:

- Backfilling - Excavations would be backfilled using stockpiled clean overburden.
- Side slope reduction - Earth moving equipment would be used to smooth the contours of excavations.
- Application of topsoil - Topsoil would be imported from other Hanford locations and spread to a uniform depth. Topsoil would then be scarified to promote bonding to the backfill and then ripped following newly established contours.
- Reseeding - An appropriate mix of native grasses and shrubs would be planted.
- Establishing plant growth - Plants would be fertilized and irrigated for one or more growing seasons to establish growth.

APPENDIX B

LIST OF REFERENCE DRAWINGS AND PHOTOGRAPHS

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Bldg: 105-B to 107-B, Effluent Line Diversion Box & Value Pit @ N70300 - Plan	H-1-1483
Bldg: 105-B to 107-B, Effluent Line Reinforced Concrete Anchors & Cradle Details	H-1-1494
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Retention Basin Pump House & Intake Well Plan & Elev.	HW-70433
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H Rod Thimble Assembly	P-3751
River Pump House Elevations & Section	P-5002
River Pump House Sections & Details	P-5005
River Pump House Support for Raw Water Lines	P-5015
Headhouse Alum Storage Handling System	P-5060
Headhouse Line Storage Handling System	P-5061
Headhouse Dry Chemical Feeding System	P-5062
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2102	44	100-B General view	6/7/51
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2102	47	100-C General view	8/29/51
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2102	49	100-C General view with B in background	7/27/51
2102	50	100-C	6/30/51
2102	51	100-C	6/30/51
2102	53	100-C Outfall	7/27/51
2102	54	100-C Overall	7-27-57
2102	217	105-C Horizontal rod room	5/28/52
2102	218	105-C Outer rod room	4/14/52
2102	219	181-B Operating floor pump house	4/14/52
2102	220	190-C Main pump house interior	4/14/52
2102	221	190-C Interior view main floor	4/14/52
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2102	223	105-C North valve pit	4/14/52
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2102	229	183-C Pump house	4/14/52
2102	230	183-C Pump house	5/28/52
2102	231	105-C Control room	4/14/52
2102	232	105-C Control room	5/28/52
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BOX NO.	NEGATIVE NO.	TITLE	DATE
2102	44	100-B General view	6/7/51
2102	234	183-C Filter building	5/28/52
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2102	236	190-C	5/28/52
2102	237	105-C Interior	4/14/52
2102	238	105-C Fan wing, supply fan	4/14/52
2102	239	105-C Storage basin	4/14/52
2102	241	105-C	4/14/52
2102	245	100-C Area	9/26/51
2102	246	105-C Building, 190-C and tunnels	9/26/51
2102	247	100-C	9/26/51
2102	283	105-C	10/30/51
2102	284	100-C Area Overall	10-30-51
2102	285	100C Area	10/30/51
2102	356	105-C Building	11/28/51
2102	357	100-C aerial	11/28/51
2102	360	100-C Area	11/28/51
2102	367	100-C Aerial view	12/31/51
2102	369	100-C Aerial	12/31/51
2102	379	100-C Area overall	1/30/52
2102	380	105-C Building	1/30/52
2102	382	100-C Pile area	1/30/52
2102	389	100C Area	3/4/52
2102	390	105-C Building	3/4/52
2102	391	100-C Area	3/4/52
2102	397	100-C Area	3/31/52
2102	398	105-C Building	3/31/52

Table B-2 List of Reference Photographs (page 3 of 5)

BOX NO.	NEGATIVE NO.	TITLE	DATE
2102	44	100-B General view	6/7/51
2102	402	Graphite layup, 105-C	4/21/52
2102	403	Face of pile, 105-C	4/21/52
2102	405	100-C Area	4/28/52
2102	406	100-C Area	4/28/52
2102	407	100-C	5/27/52
2102	408	105-C	5/27/52
2102	409	100-C	5/27/52
2102	410	105-C	12/31/51
2102	411	105-C	4/28/52
2102	413	107-C Tanks	4/28/52
2102	413	107-C Tanks	4-28-52
2102	417	107-C	5/22/52
2102	417	107-C	5-22-52
2102	438	105-C Building	6/24/52
2102	439	100-C Area	5/27/52
2102	440	100-C Area	5/27/52
2102	444	105-C Building	7/31/52
2102	445	100-C looking SE	7/31/52
2102	446	100-C	7/31/52
2102	455	105-C Building	8/29/52
2102	456	100-C	8/22/52
2102	457	100-C	8/22/52
2102	466	100-C	9/29/52
2102	469	105-C Building	9-29-52
2102	472	100-C	9/29/52
2102	479	100-C Area	10/30/52

Table B-2 List of Reference Photographs (page 4 of 5)

BOX NO.	NEGATIVE NO.	TITLE	DATE
2102	44	100-B General view	6/7/51
2102	480	100-C Area	10-30-52
2103	1005	1183-B	4/6/48
2103	1006	1182-B	7/7/48
2103	1533	100-B and 100-C Areas looking east	4-24-53
2103	1534	100-C Area looking ENE	4/24/53
2103	1535	100-B&C looking NNW	4/24/53
2103	1536	100-C Area looking NW	4-24-53
2103	1658	100-B&C	4-24-53
2103	1659	100-B&C	4-24-53
2105	3470	190-B Annex CG-558 looking west	8/24/55
2105	3471	190-B Annex showing basement wall forms	8/23/55
2105	3516	100-B, 190-B Annex looking west	9/29/55
2105	3569	190-B Annex CG-558 aerial	11-14-55
2105	3599	190-B Annex CG-558 aerial	12-8-55
2105	3609	190-B Annex	12/31/55
2105	3672	190-B Annex aerial view of construction site	1/31/56
2105	3707	190-B Annex looking NW 98% complete	3/8/56
2105	3717	190-B Annex, looking NW	3/27/56
2105	3736	100-B&C Reactor areas looking west	5/15/56
2105	3738	100-D & 100-DR Reactor areas aerial looking west	5-15-56
2105	3750	100-B & 100-C Reactor areas aerial looking north	5-15-56
2105	3903	Looking SW at acid feed 100-C Area	12-20-56
2117	3188	1904-B Outfall line CG-558	12/24/54
2117	3216	190-B Building CG-558	12/24/54

Table B-2 List of Reference Photographs (page 5 of 5)

BOX NO.	NEGATIVE NO.	TITLE	DATE
2102	44	100-B General view	6/7/51
2117	3217	190-B Building CG-558	12/24/54
2117	3218	1904-B Outfall line CG-558	12/24/54
2117	3219	190-B Outfall line CG-558	12/24/54
2117	3300	100-B	1-20-55
2117	3301	Old 100-B Water Tank	1/20/55
2117	3308	100-B&C Areas	1-20-55
2117	3309	100-B&C Areas	1-20-55
2117	3360	100-B&C Areas	5-19-55
2117	3378	190-B Area Fabrication Shop	6/6/55
2117	3382	190-B Annex CG-558	6/24/55
2117	3389	190-B Annex CG-558	6/27/55
2117	3414	190-B Addition CG-558	6/24/55
2117	3415	190-B Building Addition CG-558	6/24/55
2117	3422	190-B Addition CG-558	6/27/55
2117	3423	190-B Building Addition CG-558	6/27/55
2117	3429	190-B Annex CG-558	7/26/55
2117	3430	190-B Annex CG-558	7/27/55
2117	3437	190-B Annex CG-558	7/26/55
	90170: 1-1 thru 1-9 2-1 thru 2-7 3A-1 thru 3A-7 3-1 thru 3-8	100 B/C Area flyover photos provided by GEONEX, Sacramento	6/20/90
	91062128-7	100 B/C Area photo	1964

APPENDIX C

EQUIPMENT LIST

Table C-1 100 B/C Materials Handling Major Equipment List (page 1 of 3)

Category	Component	Description	Quantity	Unit Cost	Total	Lead Time (weeks)	Source
Excavation/ demolition	Excavation/demolition	150,000 lb. hydraulic excavator with 5 cy bucket	6	699,266	4,195,596	12	Western states
	Excavation/demolition	520 HP dozer with SU blade	1	655,560	655,560	12	Western states
	Excavation/demolition	375 HP wheel loader with 7 cy bucket	1	481,266	481,266	5	Western states
	Excavation/demolition	200,000 lb. hydraulic excavator	1	918,601	918,601	16	McDonald
	Excavation/demolition	Concrete processing equipment	2	235,920	471,840	5	Labounty
	Excavation/demolition	51" mobile shears	1	312,000	312,000	12	Labounty
	Excavation/demolition	Material densifier	1	86,000	86,000	5	Labounty
	Excavation/demolition	Hydraulic hammer	1	123,720	123,720	8	Labounty
	Excavation/demolition	9 cy grapple with sleeve	3	34,800	104,400	3	Labounty
	Stockpile management	520 HP dozer with SU blade	2	655,560	1,311,120	12	Western states
	Dust suppression	Water truck (5,000 gallon)	5	165,766	828,830	* 5	MCACES
	Dust suppression	Irrigation system (tank, pipe, and sprinkler)	5	35,201	176,005	* 5	MCACES
	Excavation Lighting	Lights	8	16,069	128,552	* 5	MCACES
	Equipment maintenance	2 1/2 ton Grease/lube service truck	1	80,250	80,250	* 12	L & M truck sales
	Equipment maintenance	Parts storage trailer	2	22,400	44,800	13	Gelco
	Equipment maintenance	Maintenance truck	1	68,750	68,750	* 12	L & M truck sales
	Equipment maintenance	2000 gallon fuel truck	1	56,000	56,000	* 12	L & M truck sales
	Commuter vehicles	Pickups used for on site travel	9	11,964	107,676	4	Russ Dean Ford

* Assumed lead time.

Table C-1 100 B/C Materials Handling Major Equipment List (page 2 of 3)

Category	Component	Description	Quantity	Unit Cost	Total	Lead Time (weeks)	Source
	Commuter vehicles	Vans used to carry personnel to the waste sites	16	16,949	271,184	4	Russ Dean Ford
	Fuel storage tanks	40,000 gal diesel storage tanks	1	59,823	59,823	6	Ace Tank
Rail	Rail	150 ton, 3000 HP locomotive	2	790,000	1,580,000	12	Morrison Knudsen
Road	Road	Tractor (truck)	20	201,863	4,037,260	* 12	Kenworth
	Road	Trailer	20	49,000	980,000	16	Red River
	Road upgrades/upkeep	275 HP motor grader	1	392,536	392,536	12	Western states
	Road upgrades/upkeep	84" Smooth drum vibratory roller	1	126,804	126,804	12	Western states
	Maintenance	Tire truck	1	75,950	75,950	* 12	L & M truck sales
	Maintenance	1 ton grease/lube service truck	1	37,650	37,650	* 12	L & M truck sales
Containers	Containers	35 cy containers including lids	130	8,510	1,106,300	16	May Fab
	Containers	Container Handler	2	428,000	856,000	22	Liftruck
	Containers	Forklift (10 ton capacity for loading lids)	2	84,328	168,656	* 8	MCACES
Equipment decontamination facility	Equipment decon	Automated decontamination facility (including waste water treatment)	1	431,000	431,000	* 12	Hudson
	Equipment decon	Manual decontamination facility	1	4,795	4,795	* 4	Hotsy
	Equipment decon	Vacuum truck	1	175,000	175,000	* 8	Big Sky Industries
Office Area	Office area	Potable water system	1	36,000	36,000	* 8	NTS
	Office area	Lunch room trailer	1	67,200	67,200	13	Gelco
	Office area	Office trailers (24' x 48')	1	46,080	46,080	13	Gelco
	Office area	Office trailers (42' x 70')	1	117,600	117,600	13	Gelco

* Assumed lead time.

Table C-1 100 B/C Materials Handling Major Equipment List (page 3 of 3)

Category	Component	Description	Quantity	Unit Cost	Total	Lead Time (weeks)	Source
	Office area	Medic/Aid trailer	1	19,760	19,760	*12	WHC
	Office area	Ambulance	1	110,000	110,000	13	Gelco
	Change area	Change Trailer, Female	1	79,800	79,800	13	Gelco
	Change area	Change Trailer, Male	1	159,600	159,600	13	Gelco
Personnel decontamination facility	Personnel decon	Decontamination Trailer	2	74,480	148,960	13	Gelco
	Personnel decon	Water Tank	1	35,082	35,082	* 5	MCACES
Recontour/Back fill	Recontour/backfill	520 HP dozer	1	655,560	655,560	12	Western States
	Recontour/backfill	375 HP wheel loader	1	481,266	481,266	5	Western States
	Recontour/backfill	112,000 lb, 21 cy struck capacity wheel Scraper	2	823,189	1,646,378	12	Western States
	Recontour/backfill	315 hp, 71,000 lb tamping foot compactor with straight blade	3	388,966	1,166,898	12	Western States
	Recontour/backfill	Water truck (5,000 gallon)	2	165,766	331,532	* 5	MCACES
Total					25,555,640		

* Assumed lead time.

Volume Estimate
100 BC Area

OBJECTIVE

Provide estimates of:

- The volume of contaminated materials within waste sites in the Hanford 100 BC Area.
- The volume of materials which will need to be excavated to remove the contaminated materials.
- The time which will be required to complete the excavation work.

Estimates are provided for each waste site. The general methods, assumptions, and references used are outlined below. Specific information, assumptions and methods are discussed in the calculation provided for each site.

METHOD

Contaminated Volume Calculation

The volume of contaminated material is calculated for minimum, probable, and maximum cases. Contaminated volumes discriminated in to four general material types - soils, concrete, metals, and soft wastes.

Volumes are calculated as follows:

Soils - The shape of the volume of contaminated soil varies by site. The following geometric shapes and their respective volume equations are used to approximate the shape of contaminated areas:

Rectangular Solid - V = l*w*d

where - l = length of contaminated area
w = width of contaminated area
d = thickness of contaminated area

Right Circular Cylinder - V = pi*r^2*h

where - r = radius of contaminated area
h = thickness of contaminated area

Truncated Rectangular Pyrimid - V = 1/6*h*(l1*w1+(l1+l2)*(w1+w2)+l2*w2)

where - h = thickness of contaminated area
l1 = length of bottom of contaminated area
w1 = width of bottom of contaminated area
l2 = length of top of contaminated area
w2 = width of top of contaminated area

Concrete and Metals - If structures are present the volume of these materials is estimated from construction drawings. Volumes of demolished and buried concrete and metal is calculated based on site specific dimensions.

Soft Waste - Buried soft waste volume is calculated based on site specific dimensions.

Excavated Volume Calculation -

The volume of excavated material is generally based on the depth of contamination and the plan area of the bottom of the excavation (bottom area). The shape of the excavations can be described by the following geometric shapes and their respective equations:

Volume Estimate
100 BC Area

METHOD (continued)

Excavated Volume Calculation (continued) -

Truncated Rectangular Pyrimid - $V = 1/6*h*(l1*w1+(l1+l2)*(w1+w2)+l2*w2)$
where - h = depth of excavation
l1 = length of bottom of excavation
w1 = width of bottom of excavation
l2 = length of top of excavation
w2 = width of top of excavation
Truncated Right Circular Cone - $V = 1/3*pi*h*(r1^2+r1*r2+r2^2)$
where - h = depth of excavation
r1 = radius of bottom of excavation
r2 = radius of top of excavation

Volumes are calculated in a slice-like or layered manner.

Ramp Volume Calculation -

Ramps are required for access to some of the larger excavations. Ramp volumes are calculated for subvolumes according to the dimensions shown on the attached figure. Volume equations for the various subvolumes are as follows:

Subvolume I = 1/2*B*A*W
Subvolume II = 1/3*(1/2*B*(B*Se))
Subvolume III = 1/2*B*(L-A)*W
Subvolume IV = 1/3*(1/2*B*(B*Se)*(L-A))

See the attached figure for parameter definitions. Ramp length, L, is calculated as follows:

L = Dr/(G/100)

The total volume of the ramp excavation is:

Ramp Volume = I + 2*II + III + 2*IV

Excavated Quantities and Duration -
A summary of the excavated quantities incorporates the appropriate bulking factors as bank cubic yards are converted to loose cubic yards.
Time required to perform the excavation is calculated based on rates derived for each type of material. See report text for a discussion of the derivation of these rates.

Volume Estimate
100 BC Area

GENERAL ASSUMPTIONS

The following assumptions are used if no other data exists. If contamination data exists, the concentrations of cesium and strontium are used to delineate the extent.

Burial Grounds -

No contamination was leached into the surrounding soil.
Burial ground dimensions are 20 ft wide at the bottom, 20 ft deep, and have 1.0 H : 1.0 V side slopes.
Five feet of cover was provided.
Burial ground waste is comprised of 75% soft waste and 25% metal waste.
Burial grounds were filled completely.

Liquid Waste Sites -

Trenches were built with 1.0 H : 1.0 V slopes.
Liquids generally moved vertically downward in the soil column; vertical hydraulic conductivity is generally one order of magnitude greater than horizontal hydraulic conductivity.
Contamination extends to 5 ft below the base of the site (probable case).
In normal operations (probable case) trenches were maintained with 1/3 freeboard. For maximum case trenches were filled to the top.
Tops of cribs are 6 ft below grade.
Maximum case contamination extends to groundwater.
Contamination from pipe leaks is symmetric.
Process effluent lines are placed in a bed of gravel 3 in below, 6 in above, and 2 ft on either side of the line.

Tile Field -

Width of tile field trench is the diameter of the pipe plus two ft.
Contamination extends to the top of the pipes in the fields.
Septic tanks of the same size have the same dimensions.

Volume Estimate
100 BC Area

REFERENCES

1 U.S. Department of Energy, Richland Operations Office (DOE-RL), 1991, Hanford Site Waste Information Data System (WIDS), Richland, Washington.

2 Dorian J.J. and V.R. Richards, "Radiological Characterization of the Retired 100 Areas," UNI-946, May 1978, United Nuclear Industries, Richland, Washington.

3 Hanford Site Drawings and Plans.

4 U.S. Department of Energy, Richland Operations Office (DOE-RL), 1993, "Limited Field Investigation Report for the 100-BC-1 Operable Unit, DOE/RL-93-06, March 1993, U.S. Department of Energy, Richland, Washington.

5 Pacific Northwest Laboratory (PNL), 1992, "In Situ Vitrification of a Mixed-Waste Contaminated Soil Site: The 116-B-6A Crib at Hanford," PNL-8281, September 1992, Pacific Northwest Laboratory Richland, Washington.

6 U.S. Department of Energy, Richland Operations Office (DOE-RL), 1993, "Limited Field Investigation Report for the 100-BC-5 Operable Unit," Decisional Draft, DOE/RL-93-97, June 1993, U.S. Department of Energy Richland, Washington.

7 Site topographic maps, Drawings H-13-000100 to H-13-000106.

8 Miller, R.L. and R.K. Wahlen, 1987, "Estimates of Solid Waste Buried in 100 Area Burial Grounds," WHC-EP-0087, October 1987, Westinghouse Hanford Company, Richland, Washington.

9 1967 Photograph of the 100 B/C Area, Number 91062128-7.

Volume Estimate
100 BC Area

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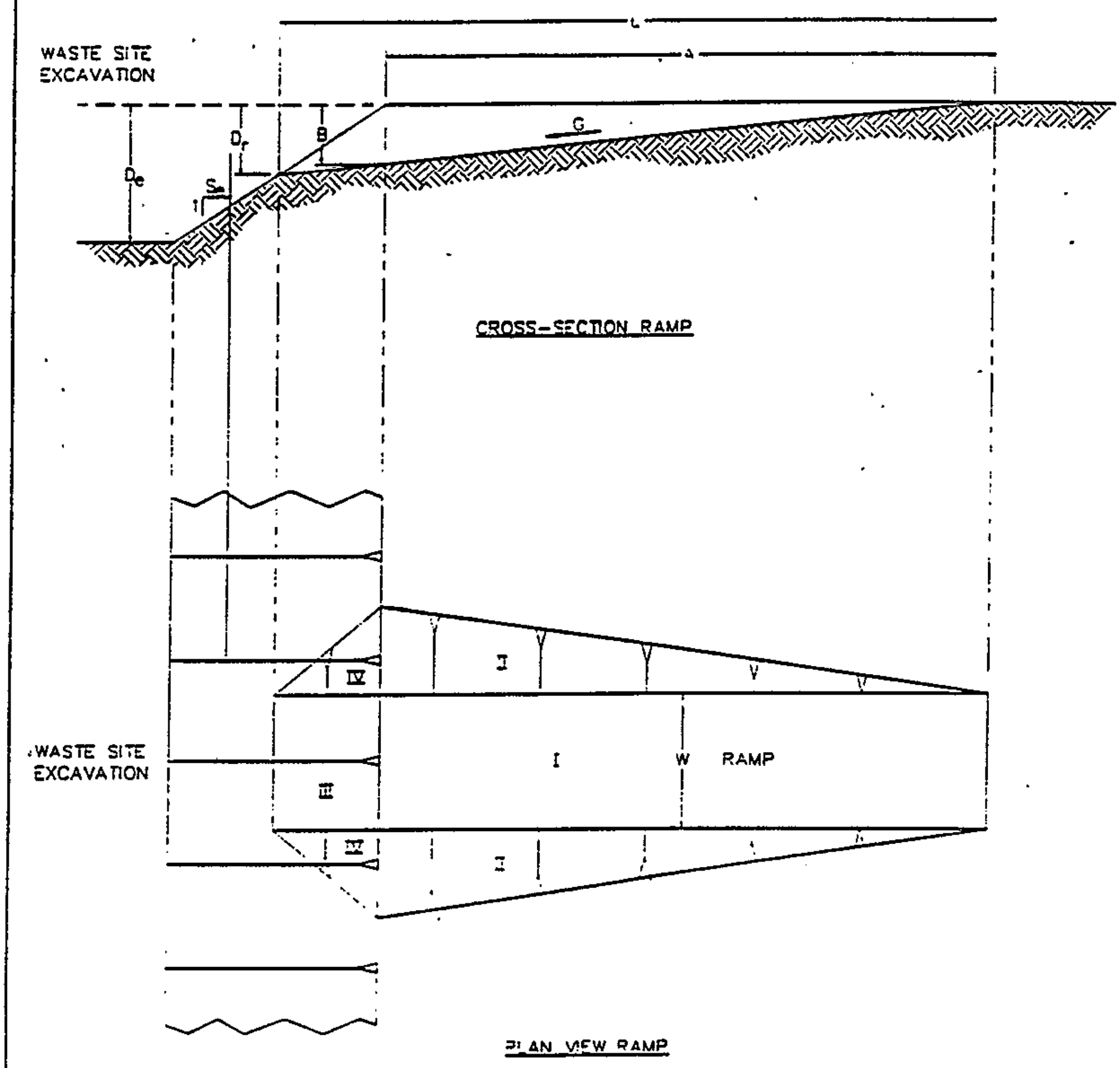


LEGEND

- D_e = EXCAVATION DEPTH
- D_r = RAMP DEPTH
- S_e = EXCAVATION SLOPE
- G = RAMP GRADE, %
- W = RAMP WIDTH
- L = RAMP LENGTH

NOTES

1. I - IV = AREAS IDENTIFIED FOR VOLUME CALCULATION.
2. DIMENSIONS 'A' AND 'B' USED FOR VOLUME CALCULATION

0 15 30 60 FEET
SCALE

TYPICAL RAMP EXCAVATION

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-11
SITE NAME: 107-B Retention Basin

CONTAMINATED DIMENSION ASSUMPTIONS:

Retention Basin -
Length - 450 ft (Ref 1); 467 ft (use 470 ft) (Ref 3)
Width - 230 ft (Ref 1, 3)
Depth - 5 ft below grade (Ref 2), the basin has been backfilled with soil and debris to a depth of about 4 ft. This fill is contaminated.
Contaminated Area -
Lateral - Data (Ref 2) indicate that contamination has spread laterally up to 200 ft to the north and up to 50 ft in all other directions.
Minimum - Assume no lateral movement.
Probable - Assume lateral spread to 200 ft north, 50 ft all other directions.
Maximum - Assume lateral spread to 200 ft north, 50 ft all other directions.
Depth -
Minimum - From surface to 5 ft below basin, 9 ft below top of basin fill, 10 ft below grade.
Probable - From surface to groundwater, 35 ft below top of basin fill, 36 ft below grade.
Maximum - From surface to groundwater, 35 ft below top of basin fill, 36 ft below grade.
Concrete -
Concrete walls surrounded the basin. Walls were 10 ft high, and ranged in thickness from 5 ft 8 in at the bottom to 1 ft thick at the top. The approximate 5 ft wall extention above grade was demolished and incorporated into the basin backfill.
The floor of the unit was also concrete (gunite).
Other Materials -
Includes wood bracing and fencing. Materials were included in the basin backfill.
Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 427 ft (Ref 7)
Groundwater - 392 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.
Basin fill (sludge, concrete, and other materials) excavated as one unit.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER 116-B-11

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Basin Fill (total)	470	230	4	108,100	108,100	16,015
Concrete						6,486
Soft Materials						104
Contaminated Area						
North of Basin	0	0	0	0	0	0
South of Basin	0	0	0	0	0	0
East of Basin	0	0	0	0	0	0
West of Basin	0	0	0	0	0	0
Below Basin Bottom	470	230	5	108,100	108,100	20,019
Subtotal	470	230	5	108,100	108,100	20,019
TOTAL			9			36,033

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Basin Fill (total)	470	230	4	108,100	108,100	16,015
Concrete						6,486
Soft Materials						104
Contaminated Area						
North of Basin	470	200	36	94,000	94,000	125,333
South of Basin	470	50	36	23,500	23,500	31,333
East of Basin	50	480	36	24,000	24,000	32,000
West of Basin	50	480	36	24,000	24,000	32,000
Below Basin Bottom	470	230	35	108,100	108,100	140,130
Subtotal	570	480	36	273,600	273,600	360,796
TOTAL			36			376,811

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Basin Fill (total)	470	230	4	108,100	108,100	16,015
Concrete						6,486
Soft Materials						104
Contaminated Area						
North of Basin	470	200	36	94,000	94,000	125,333
South of Basin	470	50	36	23,500	23,500	31,333
East of Basin	50	480	36	24,000	24,000	32,000
West of Basin	50	480	36	24,000	24,000	32,000
Below Basin Bottom	470	230	35	108,100	108,100	140,130
Subtotal	570	480	36	273,600	273,600	360,796
TOTAL			36			376,811

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-11

EXCAVATED VOLUME

MINIMUM

Unit	Length	Width	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Basin Layer							
Surrounding Basin	500	260	5	118,825	1.5	130,000	2,028
Basin Fill	485	245	5	108,100	1.5	118,825	21,005
Unfilled	470	230	1	108,100	0	108,100	-4,004
Subtotal							19,029
Volume Below Basin							
Subtotal	485	245	5	108,100	1.5	118,825	21,005
TOTAL			10				40,033

PROBABLE

Unit	Length	Width	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Basin Layer							
Surrounding Basin	678	588	5	379,899	1.5	398,664	51,078
Basin Fill	485	245	5	108,100	1.5	118,825	21,005
Unfilled	470	230	1	108,100	0	108,100	-4,004
Subtotal							68,079
Volume Below Basin							
Subtotal	663	573	31	273,600	1.5	379,899	373,502
TOTAL			36				441,580

MAXIMUM

Unit	Length	Width	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Basin Layer							
Surrounding Basin	678	588	5	379,899	1.5	398,664	51,078
Basin Fill	485	245	5	108,100	1.5	118,825	21,005
Unfilled	470	230	1	108,100	0	108,100	-4,004
Subtotal							68,079
Volume Below Basin							
Subtotal	663	573	31	273,600	1.5	379,899	373,502
TOTAL			36				441,580

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-11

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
36	36	1.5	10	40	360	306	30.6	14,402

Sub-Volume I	6,936
Sub-Volume II	5,306
Sub-Volume III	1,224
Sub-Volume IV	936

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-11

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	22,101 lcy	1500 lcy/shift	14.7	14.7
Contaminated Material	424,576 lcy	2000 lcy/shift	212.3	212.3
Other Clean Material	76,428 lcy	2000 lcy/shift	38.2	38.2
Ramp	16,995 lcy	2000 lcy/shift	8.5	8.5
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	10,378 lcy	200 lcy/shift	51.9	51.9
Concrete Loading	10,378 lcy	1500 lcy/shift	6.9	6.9
TOTAL	540,100 lcy		332.5	332.5

NOTES:

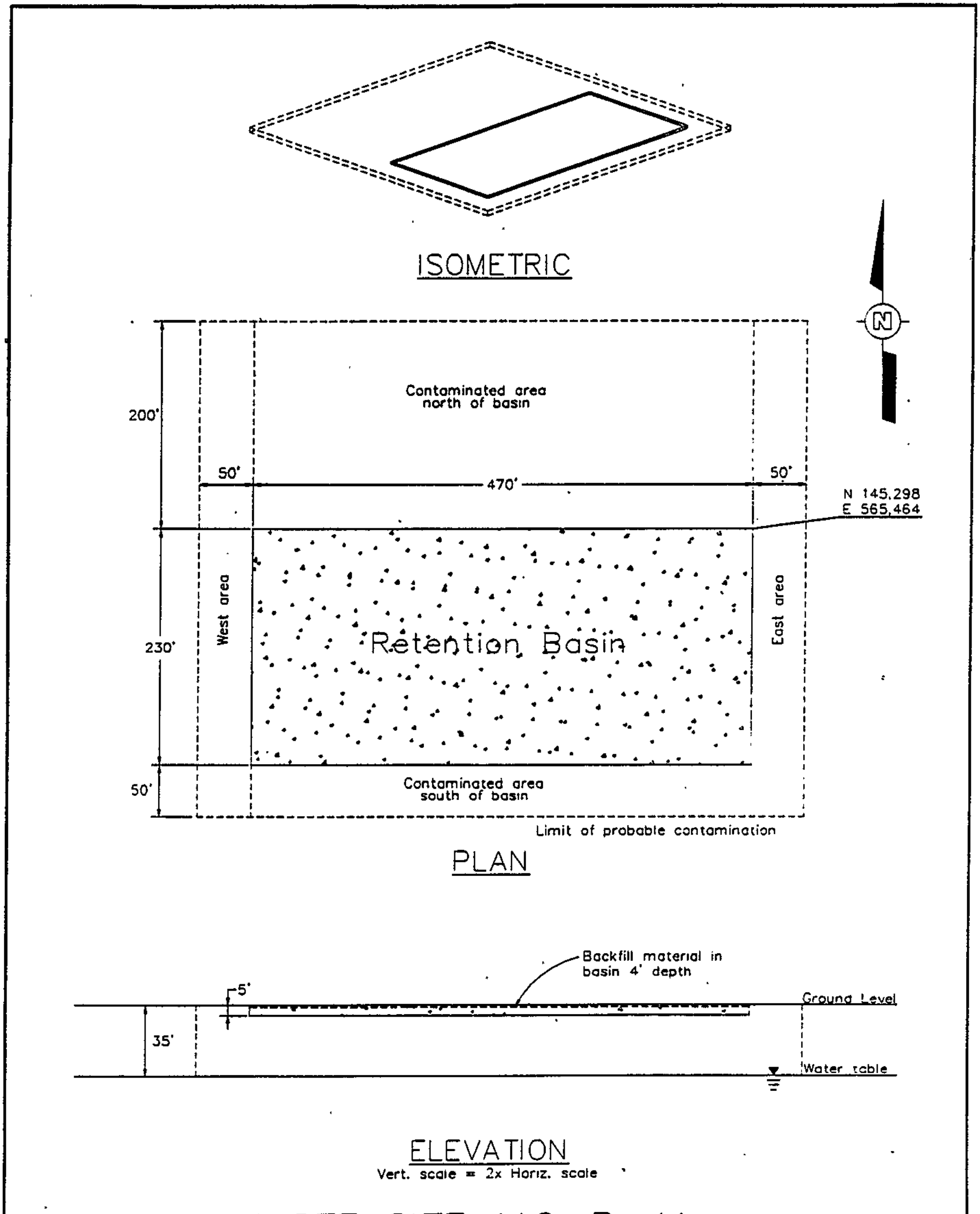
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 116-B-11

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-5
SITE NAME: 107-C Retention Basin

CONTAMINATED DIMENSION ASSUMPTIONS:

Retention Basins -
The retention consists of two carbon steel tanks with a series of baffle plates inside. Dimensions of each tank are as follows:
Diameter - 330 ft (Ref 1), inside diameter.
Depth - The tanks sit on grade (Ref 3, 6), walls are 16 ft high (Ref 1).
Slopes - The tanks have vertical walls.
The tanks were backfilled with 3 ft of soil (Ref 4).

Contaminated Area -
Lateral - Distribution plots made from boring analytical data (Ref 2) indicate that contamination has dispersed to a distance of up to 100 ft from the edges of the tanks.
Minimum - No lateral contamination.
Probable/Maximum - Contaminated to 100 ft from the edge of the tanks (391,577 ft total area as calculated by Autocad)
Depth -
Minimum - Five ft of material below tanks is contaminated.
Probable - assume contaminated to groundwater, 39 ft below grade.
Maximum - Same as probable.

Other Materials -
The tanks are constructed of carbon steel with concrete ring footings.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 434 ft (Ref 7)
Groundwater - 395 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.
Basin fill removed prior to tank demolition.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a regular cylinder.
The shape of the excavation is assumed to be that of a truncated rectangular cone with the radius equal to the equivalent radius of the area contaminated.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER 116-C-5

CONTAMINATED VOLUME

MINIMUM

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Uncontaminated Cover	0	0	0	0	0	0
Basin Fill	660	171,060	3	171,060	171,060	19,007
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	660	171,060	5	171,060	171,060	30,881
Subtotal	660	171,060	5	171,060	171,060	30,881
Concrete						797
Tank Steel						307
TOTAL			8			50,991

PROBABLE

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Uncontaminated Cover	0	0	0	0	0	0
Basin Fill	660	171,060	3	171,060	171,060	19,007
Contaminted Area						
Lateral	220	220,517	39	220,517	220,517	318,525
Below Base of Unit	660	171,060	39	171,060	171,060	246,289
Subtotal	880	391,577	39	391,577	391,577	564,814
Concrete						797
Tank Steel						307
TOTAL			39			584,925

MAXIMUM

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Uncontaminated Cover	0	0	0	0	0	0
Basin Fill	660	171,060	3	171,060	171,060	19,007
Contaminted Area						
Lateral	220	220,517	39	220,517	220,517	318,525
Below Base of Unit	660	171,060	39	171,060	171,060	246,289
Subtotal	880	391,577	39	391,577	391,577	564,814
Concrete						797
Tank Steel						307
TOTAL			39			584,925

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-5

EXCAVATED VOLUME

MINIMUM

Unit	quiv. Bot Radius (ft	Equiv. To Radius (ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Basin Fill	233	233	3.0	171,060	0.0	171,060	19,007
Contaminated Area							
Lateral				0			
Below Base of Unit				171,060			
Subtotal	233	241	5.0	171,060	1.5	182,233	31,910
Concrete							797
Tank Steel							307
TOTAL			5.0				52,020

PROBABLE

Unit	quiv. Bot Radius (ft	Equiv. To Radius (ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Basin Fill	233	233	3.0	171,060	0.0	171,060	19,007
Contaminated Area							
Lateral				220,517			
Below Base of Unit				171,060			
Subtotal	353	412	39.0	391,577	1.5	532,097	663,712
Concrete							797
Tank Steel							307
TOTAL			39.0				683,823

MAXIMUM

Unit	quiv. Bot Radius (ft	Equiv. To Radius (ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Basin Fill	233	233	3.0	171,060	0.0	171,060	19,007
Contaminated Area							
Lateral				220,517			
Below Base of Unit				171,060			
Subtotal	353	412	39.0	391,577	1.5	532,097	663,712
Concrete							797
Tank Steel							307
TOTAL			39.0				683,823

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-5

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
39	39	1.5	10	40	390	331.5	33.15	17,513

Sub-Volume I	8,140
Sub-Volume II	6,746
Sub-Volume III	1,437
Sub-Volume IV	1,190

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-5

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	25,729 lcy	1500 lcy/shift	17.2	17.2
Contaminated Material	666,481 lcy	2000 lcy/shift	333.2	333.2
Other Clean Material	116,700 lcy	2000 lcy/shift	58.3	58.3
Ramp	20,666 lcy	2000 lcy/shift	10.3	10.3
Misc Material Handling				
Metals Demolition	2,026 tons	100 ton/shift	20.3	20.3
Metals Loading	2,026 tons	900 ton/shift	2.3	2.3
Concrete Demolition	1,275 lcy	200 lcy/shift	6.4	6.4
Concrete Loading	1,275 lcy	1500 lcy/shift	0.9	0.9
TOTAL	829,576 lcy		448.8	448.8

NOTES:

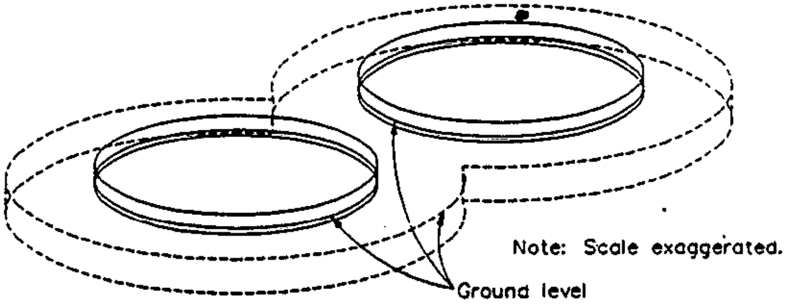
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

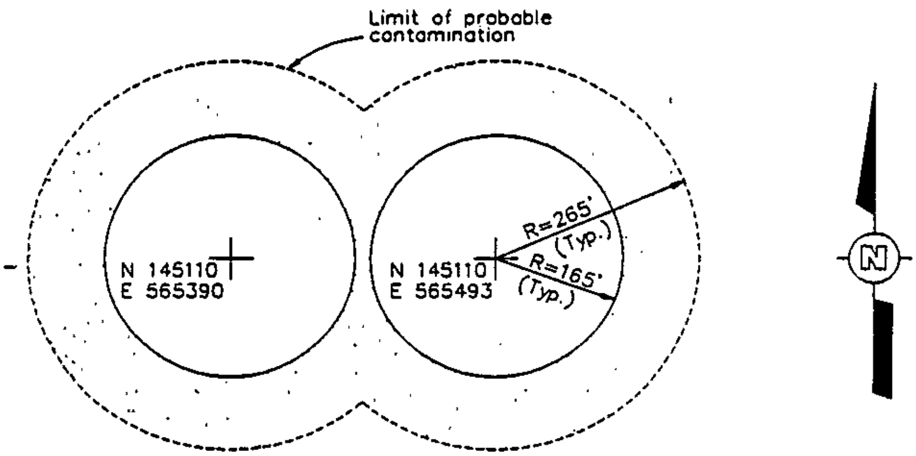
- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

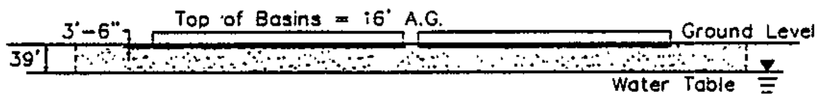
(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



ISOMETRIC



ELEVATION



PLAN

SCALE: NONE

WASTE SITE 116-C-5

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-1
SITE NAME: 107-B Liquid Waste Disposal Trench

CONTAMINATED DIMENSION ASSUMPTIONS:

Disposal Trench -

Length - 375 ft along top, 355 ft along bottom (Ref 9).
Width - 30 ft along bottom, 50 ft along top (Ref 9).
Depth - Bottom of trench is 15 ft below grade (Ref 1). Sandy gravel fill exists to a depth of about 21 ft (6 ft below the basin bottom) (Ref 4).
Slopes - 1.0H:1.5V, based on 30 ft bottom width, 50 ft top width.
Disposal trench has been backfilled (Ref 7); backfill assumed to be uncontaminated.

Contaminated Area -

North, South, East, West - No lateral contamination.
Depth -
Minimum - The 6 feet of sandy gravel fill below the bottom of the trench.
Probable - Trench filled to average 10 ft above base, side slopes and substrate contaminated to depth of 5 ft below the base of the sandy gravel fill.
Maximum - Trench filled to grade (15 ft above base), side slopes and substrate contaminated to groundwater, 48 ft below grade.

Other Materials -

None assumed to be present.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 440 ft (Ref 7)
Groundwater - 392 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-1

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench (Uncontaminated)					0.7		
Top dimension	355	30	0			10,650	
Bottom dimension	355	30	0	10,650			
Subtotal							0
Contaminated Area							
Side Slopes	355	30	0	10,650		10,650	0
Below Base of Unit	355	30	6	10,650		10,650	2,367
Lateral	0	0	0	0		0	0
Subtotal	355	30	6	10,650		10,650	2,367
Other Materials							0
TOTAL			6				2,367

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench (Uncontaminated)					0.7		
Top dimension	368	43	10			15,961	
Bottom dimension	355	30	10	10,650			
Subtotal							4,917
Contaminated Area							
Side Slopes	368	43	10	15,961		15,961	995
Below Base of Unit	368	43	11	15,961		15,961	6,503
Lateral	0	0	0	0		0	0
Subtotal	368	43	11	15,961		15,961	7,497
Other Materials							0
TOTAL			21				7,497

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench (Uncontaminated)					0.7		
Top dimension	375	50	15			18,750	
Bottom dimension	355	30	15	10,650			
Subtotal							8,130
Contaminated Area							
Side Slopes	375	50	15	18,750		18,750	2,287
Below Base of Unit	375	50	33	18,750		18,750	22,917
Lateral	0	0	0	0		0	0
Subtotal	375	50	33	18,750		18,750	25,204
Other Materials							0
TOTAL			48				25,204

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Volume Estimate
100 BC Area

SITE NUMBER: 116-B-1

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden Top dimension Bottom dimension Subtotal	418	93	5	31,434	1.5	38,874	6,503
Contaminated Layer Side Slopes Below Base of Unit Lateral Subtotal	403	78	16	10,650	1.5	31,434	12,242
Other Materials							0
TOTAL			21				18,745

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden Top dimension Bottom dimension Subtotal	446	121	5	45,865	1.5	54,155	9,254
Contaminated Layer Side Slopes Below Base of Unit Lateral Subtotal	431	106	21	15,961	1.5	45,865	23,529
Other Materials							0
TOTAL			26				32,783

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden Top dimension Bottom dimension Subtotal	519	194	5	90,216	1.5	100,686	17,669
Contaminated Layer Side Slopes Below Base of Unit Lateral Subtotal	504	179	43	18,750	1.5	90,216	82,352
Other Materials							0
TOTAL			48				100,021

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Volume Estimate
100 BC Area

SITE NUMBER: 116-B-1

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
26	26	1.5	10	40	260	221	22.1	6,604

Sub-Volume I	3,618
Sub-Volume II	1,999
Sub-Volume III	638
Sub-Volume IV	353

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-1

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	10,920 lcy	2000 lcy/shift	5.5	5.5
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	8,847 lcy	1800 lcy/shift	4.9	4.9
Other Clean Material	18,918 lcy	1800 lcy/shift	10.5	10.5
Ramp	7,793 lcy	2000 lcy/shift	3.9	3.9
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	46,477 lcy		24.8	24.8

NOTES:

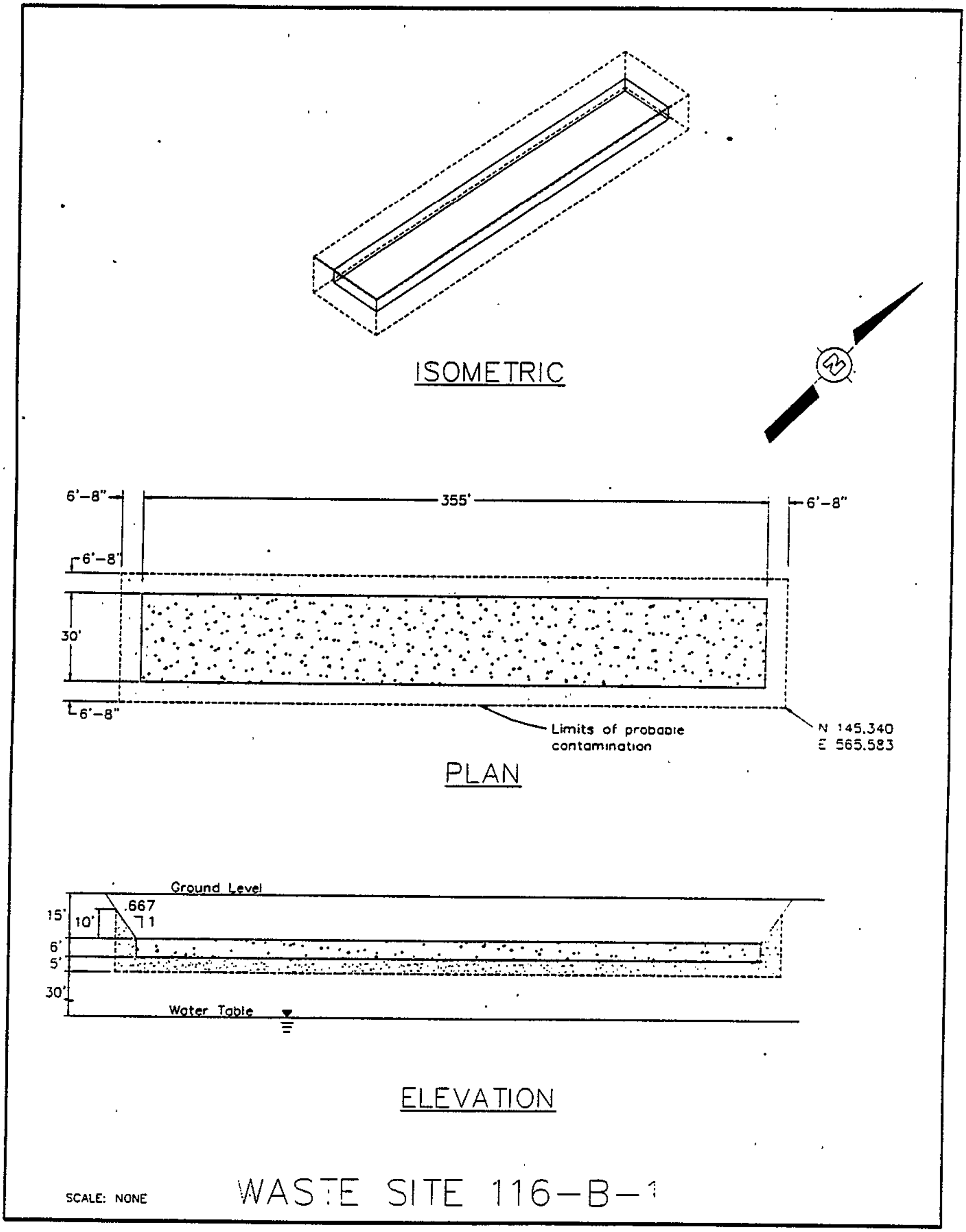
(1) --Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.


ISOMETRIC
N
6'-8"
355'
6'-8"
6'-8"
30'
6'-8"
Limits of probable contamination
N 145,340
E 565,583
PLAN
Ground Level
15'
10'
.667
1
6'
5'
30'
Water Table
ELEVATION
SCALE: NONE
WASTE SITE 116-B-1

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-2
SITE NAME: 105-B Storage Basin Trench

CONTAMINATED DIMENSION ASSUMPTIONS:

Disposal Trench -
Length - 75 ft along bottom (Ref 1).
Width - 10 ft along bottom (Ref 1).
Depth - Bottom of Basin is 20 ft below grade (Ref 1).
Slopes - 1.0H:1.0V
Disposal trench has been backfilled with clean material. This material is not included in the contaminated volume estimate.

Contaminated Area -
North, South, East, West - Distribution plots made from boring analytical data (Ref 2) suggest that contamination has dispersed to a distance of 40 ft from the edges of the trench.
Minimum - No lateral conatmination.
Probable/Maximum - Lateral contamination to 40 ft from the edge of the trench.
Depth - A clay layer exists at a depth of about 15 ft below grade (Ref 4).
Minimum - The 5 feet below the bottom of the trench.
Probable - Trench filled to average 10 ft depth, side slopes and substrate contaminated to depth of 28 ft, 13 ft below the base trench.
Maximum - Trench filled to grade (15 ft), side slopes and substrate contaminated to groundwater, 74 ft (Ref 6).

Other Materials -
None assumed to be present.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 471 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-2

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench (Clean)					1.0		
Top dimension	75	10	0			750	
Bottom dimension	75	10	0	750			
Subtotal							0
Contaminated Area							
Side Slopes	75	10	0	750		750	0
Below Base of Unit	75	10	5	750		750	139
Lateral	0	0	0	0		0	0
Subtotal	75	10	5	750		750	139
Other Materials							0
TOTAL			5				139

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench (Clean)					1.0		
Top dimension	95	30	10			2,850	
Bottom dimension	75	10	10	750			
Subtotal							642
Contaminated Area							
Side Slopes	155	90	10	13,950		13,950	4,525
Below Base of Unit	155	90	13	13,950		13,950	6,717
Lateral	0	0	0	0		0	0
Subtotal	155	90	13	13,950		13,950	11,241
Other Materials							0
TOTAL			23				11,241

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench (Clean)					1.0		
Top dimension	105	40	15			4,200	
Bottom dimension	75	10	15	750			
Subtotal							1,292
Contaminated Area							
Side Slopes	155	90	15	13,950		13,950	6,458
Below Base of Unit	155	90	59	13,950		13,950	30,483
Lateral	0	0	0	0		0	0
Subtotal	155	90	59	13,950		13,950	36,942
Other Materials							0
TOTAL			74				36,942

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Volume Estimate
100 BC Area

SITE NUMBER: 116-B-2

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Top Area sf	Bottom Area sf	Slope H/V	Volume bcy
Overburden							
Top dimension							
Bottom dimension					6,600		
Subtotal	135	70	5	9,450	6,600	1.5	1,479
Contaminated Layer							
Side Slopes							
Below Base of Unit							
Lateral							
Subtotal	120	55	15	6,600	750	1.5	1,854
Other Materials							0
TOTAL			20				3,333

PROBABLE

Unit	Length ft	Width ft	Depth ft	Top Area sf	Bottom Area sf	Slope H/V	Volume bcy
Overburden							
Top dimension							
Bottom dimension					35,616		
Subtotal	239	174	5	41,586	35,616	1.5	7,141
Contaminated Layer							
Side Slopes							
Below Base of Unit							
Lateral							
Subtotal	224	159	23	35,616	13,950	1.5	20,436
Other Materials							0
TOTAL			28				27,577

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Top Area sf	Bottom Area sf	Slope H/V	Volume bcy
Overburden							
Top dimension							
Bottom dimension					117,624		
Subtotal	377	312	0	117,624	117,624	1.5	0
Contaminated Layer							
Side Slopes							
Below Base of Unit							
Lateral							
Subtotal	377	312	74	117,624	13,950	1.5	157,793
Other Materials							0
TOTAL			74				157,793

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-2

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
28	28	1.5	10	40	280	238	23.8	7,873

Sub-Volume I	4,196
Sub-Volume II	2,497
Sub-Volume III	740
Sub-Volume IV	441

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-2

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	8,427 lcy	2000 lcy/shift	4.2	4.2
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	13,265 lcy	1800 lcy/shift	7.4	7.4
Other Clean Material	10,849 lcy	1800 lcy/shift	6.0	6.0
Ramp	9,291 lcy	2000 lcy/shift	4.6	4.6
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	41,831 lcy		22.3	22.3

NOTES:

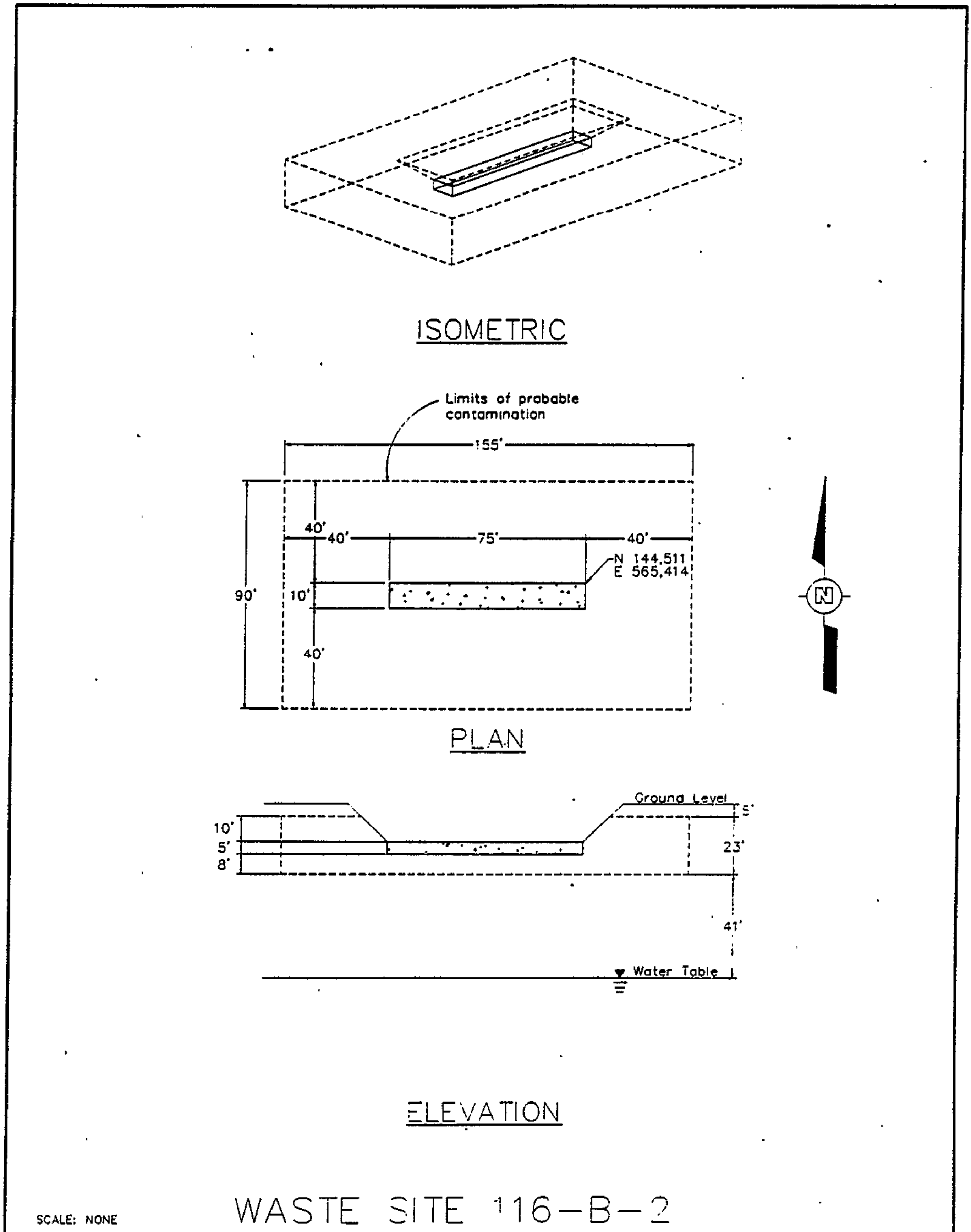
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.


ISOMETRIC
Limits of probable contamination
155'
40'
40'
75'
40'
N 144,511
E 565,414
90'
10'
40'
PLAN
Ground Level
5'
10'
5'
8'
23'
41'
Water Table
ELEVATION
SCALE: NONE
WASTE SITE 116-B-2

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-13
SITE NAME: 107-B South Sludge Trench

CONTAMINATED DIMENSION ASSUMPTIONS:

Sludge Trench -
Length - 50 ft (Ref 1)
Width - 50 ft (Ref 1)
Depth - 10 ft (Ref 1)
Sludge trench has been covered (backfilled) with 6 ft of soil (Ref 1).

Contaminated Area -
North, South, East, West - No lateral contamination.
Depth -
Minimum - Trench only.
Probable - Trench plus 3 ft of substrate below trench.
Maximum - Trench and substrate below the trench to groundwater, 46 ft (Ref 6,7) below surface.

Other Materials -
None assumed to be present.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 440 ft (Ref 7).
Groundwater - 394 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

The contaminated volume of this unit is within the volume of 116-B-11 and will be included in that volume.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a rectangular solid.
Volumes are given in bank cubic yards.

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-13

CONTAMINATED VOLUME

MINIMUM

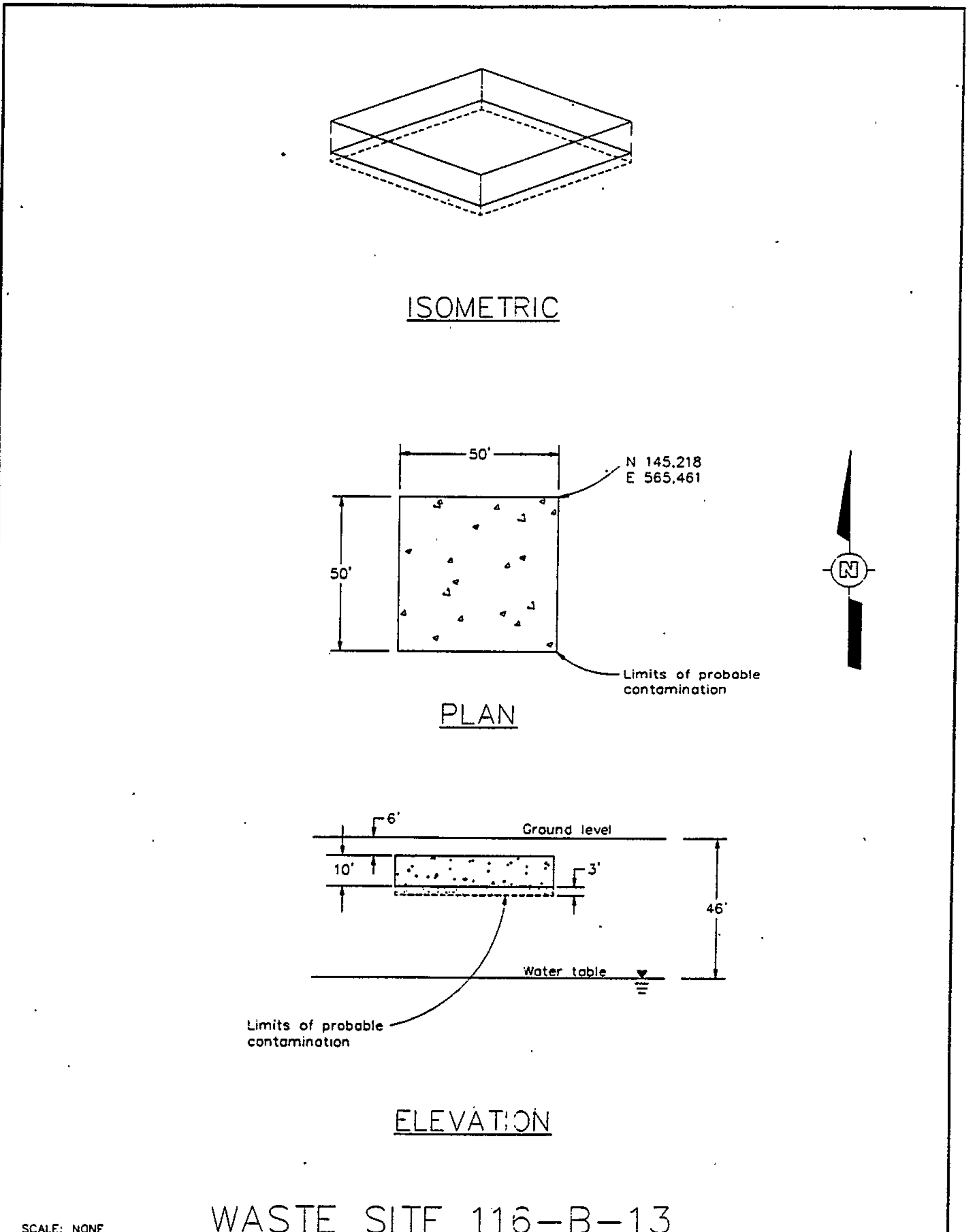
Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Trench Fill	50	50	10	2,500	2,500	926
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			10			926

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Trench Fill	50	50	10	2,500	2,500	926
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	50	50	3	2,500	2,500	278
Subtotal	50	50	3	2,500	2,500	278
Concrete						0
Other Materials						0
TOTAL			13			1,204

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Trench Fill	50	50	10	2,500	2,500	926
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	50	50	36	2,500	2,500	3,333
Subtotal	50	50	36	2,500	2,500	3,333
Concrete						0
Other Materials						0
TOTAL			46			4,259



WASTE SITE 116-B-13

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-14
SITE NAME: 107-B North Sludge Trench

CONTAMINATED DIMENSION ASSUMPTIONS:

Sludge Trench -
Length - 120 ft (Ref 1)
Width - 10 ft (Ref 1)
Depth - 10 ft (Ref 1)
Sludge trench has been covered (backfilled) with 6 ft of soil (Ref 1).

Contaminated Area -
North, South, East, West - No lateral contamination.
Depth -
Minimum - Trench only.
Probable - Trench plus 3 ft of substrate below trench.
Maximum - Trench and substrate below the trench to groundwater, 46 ft (Ref 6,7) below surface.

Other Materials -
None assumed to be present.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 440 ft (Ref 7).
Groundwater - 394 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

The contaminated volume of this unit is within the volume of 116-B-11 and will be included in that volume.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a rectangular solid.
Volumes are given in bank cubic yards.

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-14

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Trench Fill	120	10	10	1,200	1,200	444
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			10			444

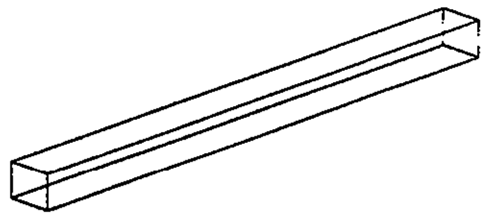
PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Trench Fill	120	10	10	1,200	1,200	444
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	120	10	3	1,200	1,200	133
Subtotal	120	10	3	1,200	1,200	133
Concrete						0
Other Materials						0
TOTAL			13			578

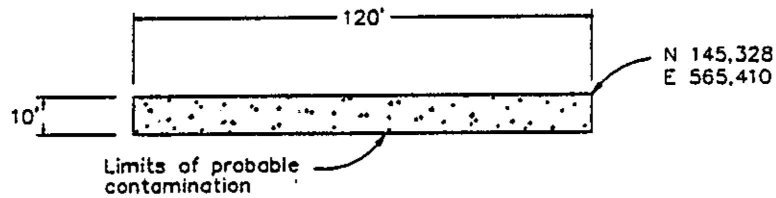
MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Trench Fill	120	10	10	1,200	1,200	444
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	120	10	36	1,200	1,200	1,600
Subtotal	120	10	36	1,200	1,200	1,600
Concrete						0
Other Materials						0
TOTAL			46			2,044

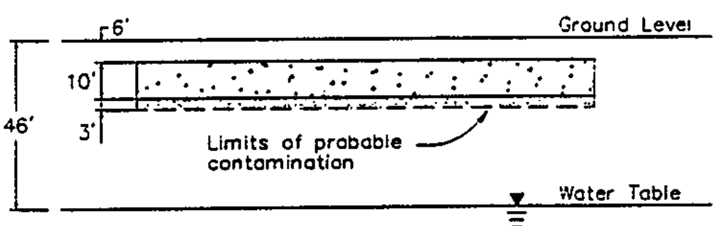
116B14.XLS 6/28/93



ISOMETRIC



PLAN



ELEVATION

SCALE: NONE

WASTE SITE 116-B-14

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-15
SITE NAME: 105-B Fuel Storage Basin Cleanout Percolation Pit

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
Length - 100 ft (Ref 1).
Width - 50 ft (Ref 1).
Depth - Bottom of basin is 6 ft below grade (Ref 1).
Slopes - 1.0H:1.0V
Basin has not been backfilled.

Contaminated Area -
North, South, East, West - No lateral contamination.
Depth -
Minimum - No contamination.
Probable - No contamination.
Maximum - Basin was filled with waste to grade (6 ft), side slopes and substrate contaminated to groundwater, 79 ft below grade (Ref 6).

Other Materials -
None assumed to be present.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 476 ft (Ref 7)
Groundwater -397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Basin void space is not included in contaminated or excavated volumes.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-15

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Basin (Void)					1.0		
Top dimension	100	50	0			5,000	
Bottom dimension	100	50	0	5,000			
Subtotal							0
Contaminated Area							
Side Slopes	100	50	0	5,000		5,000	0
Below Base of Unit	100	50	0	5,000		5,000	0
Lateral	0	0	0	0		0	0
Subtotal	100	50	0	5,000		5,000	0
Other Materials							0
TOTAL			0				0

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Basin (Void)					1.0		
Top dimension	100	50	0			5,000	
Bottom dimension	100	50	0	5,000			
Subtotal							0
Contaminated Area							
Side Slopes	100	50	0	5,000		5,000	0
Below Base of Unit	100	50	0	5,000		5,000	0
Lateral	0	0	0	0		0	0
Subtotal	100	50	0	5,000		5,000	0
Other Materials							0
TOTAL			0				0

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Basin (Void)					1.0		
Top dimension	112	62	6			6,944	
Bottom dimension	100	50	6	5,000			
Subtotal							1,322
Contaminated Area							
Side Slopes	112	62	6	6,944		6,944	221
Below Base of Unit	112	62	73	6,944		6,944	18,775
Lateral	0	0	0	0		0	0
Subtotal	112	62	73	6,944		6,944	18,996
Other Materials							0
TOTAL			79				18,996

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-15

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Top Area sf	Bottom Area sf	Slope H/V	Volume bcy
Basin Layer							
Top dimension							
Bottom dimension					5,000		
Subtotal	100	50	0	5,000	5,000	1.5	0
Contaminated Layer							
Side Slopes							
Below Base of Unit							
Lateral							
Subtotal	100	50	0	5,000	5,000	1.5	0
Other Materials							0
TOTAL			0				0

PROBABLE

Unit	Length ft	Width ft	Depth ft	Top Area sf	Bottom Area sf	Slope H/V	Volume bcy
Basin Layer							
Top dimension							
Bottom dimension					5,000		
Subtotal	100	50	0	5,000	5,000	1.5	0
Contaminated Layer							
Side Slopes							
Below Base of Unit							
Lateral							
Subtotal	100	50	0	5,000	5,000	1.5	0
Other Materials							0
TOTAL			0				0

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Top Area sf	Bottom Area sf	Slope H/V	Volume bcy
Basin Layer							
Top dimension							
Bottom dimension					93,011		
Subtotal	349	299	6	104,351	93,011	1.5	21,917
Contaminated Layer							
Side Slopes							
Below Base of Unit							
Lateral							
Subtotal	331	281	73	93,011	6,944	1.5	113,512
Other Materials							0
TOTAL			79				135,429

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-15

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
0	0	1.5	10	40	0	#DIV/0!	#DIV/0!	#DIV/0!

Sub-Volume I	#DIV/0!
Sub-Volume II	#DIV/0!
Sub-Volume III	#DIV/0!
Sub-Volume IV	#DIV/0!

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-15

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	0 lcy	1800 lcy/shift	0.0	0.0
Other Clean Material	0 lcy	1800 lcy/shift	0.0	0.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	0 lcy		0.0	0.0

NOTES:

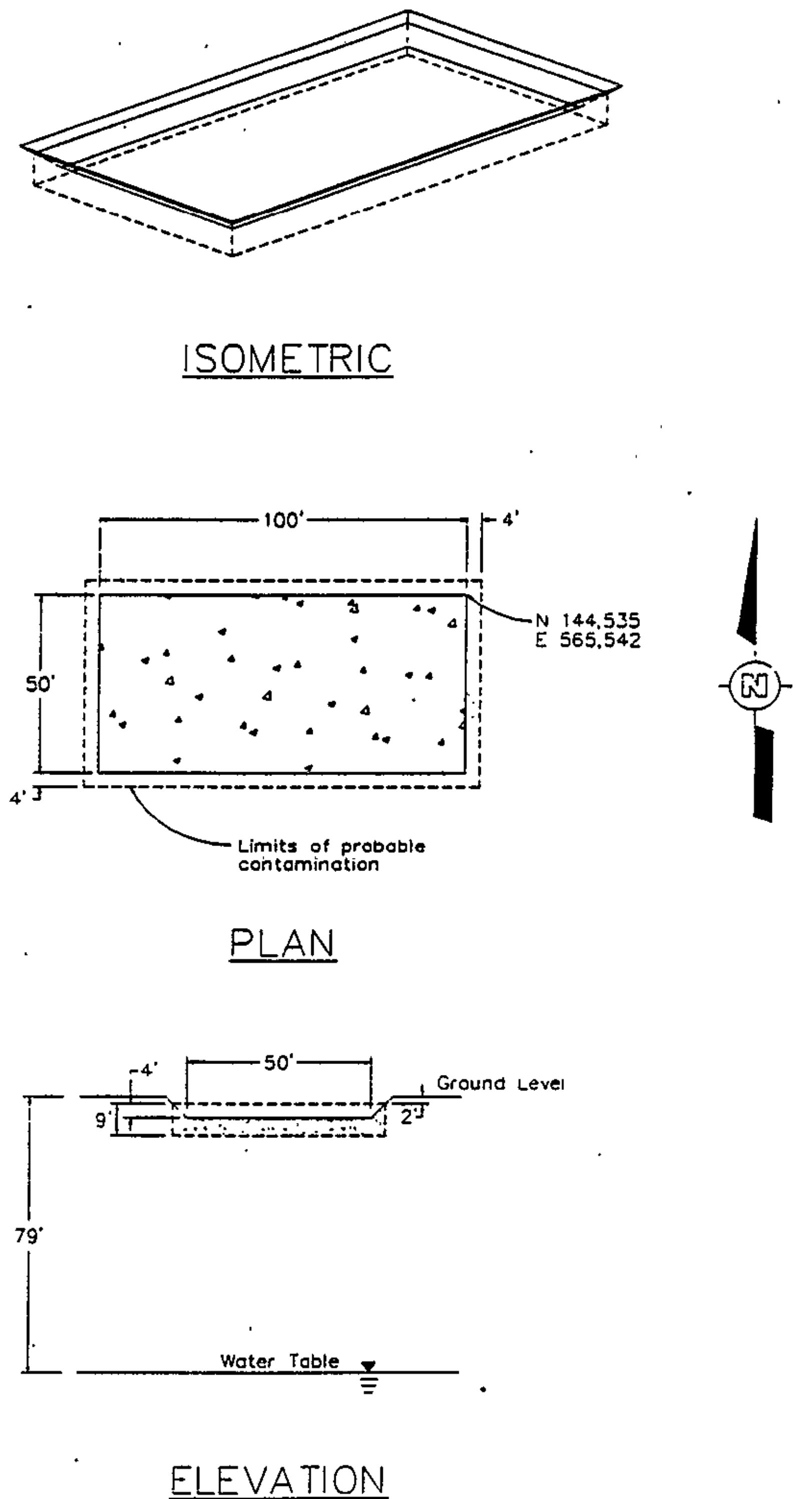
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 116-B-15

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-1
SITE NAME: 107-C Liquid Waste Disposal Trench

CONTAMINATED DIMENSION ASSUMPTIONS:

Disposal Trench -
Length - 500 ft along bottom (Ref 1, 3).
Width - 50 ft along bottom (Ref 1, 3).
Depth - Bottom of Basin is 25 ft below grade (Ref 1).
Slopes - 1.5H:1.0V
Disposal trench has been backfilled (Ref 7), assume this material is contaminated.

Contaminated Area -
North, South, East, West - Data (Ref 2) suggest that contamination has spread laterally to distances of up to 100 ft from the base of the trench.
Minimum - Material within the trench only.
Probable - Lateral spread to 40 ft NE, none in other directions.
Maximum - Lateral spread to 120 ft NE, 50 ft SE, none in other directions.
Depth -
Minimum - No contamination below the base of the trench (25 ft).
Probable - Trench was filled to grade with liquids, side slopes and substrate contaminated to depth of 5 ft below the base of the trench.
Maximum - Trench filled to grade with liquids, side slopes and substrate contaminated to groundwater, 45 ft below grade.

Other Materials -
None assumed to be present.

ELEVATIONS:

Surface - 437 ft (Ref 7)
Groundwater - 392 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-1

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Material					1.5		
Top dimension	575	125	25			71,875	
Bottom dimension	500	50	25	25,000			
Subtotal							43,981
Contaminated Area							
Side Slopes							
Below Base of Unit							
Lateral							
Subtotal	0	0	0	0		0	0
Other Materials							0
TOTAL			25				43,981

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Material					1.5		
Top dimension	575	125	25			71,875	
Bottom dimension	500	50	25	25,000			
Subtotal							43,981
Contaminated Area							
Side Slopes	575	125	25	71,875		71,875	22,569
Below Base of Unit	575	125	5	71,875		71,875	13,310
Lateral	40	125	30	5,000		5,000	5,556
Subtotal	615	125	30	76,875		76,875	41,435
Other Materials							0
TOTAL			30				85,417

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Material					1.5		
Top dimension	575	125	25			71,875	
Bottom dimension	500	50	25	25,000			
Subtotal							43,981
Contaminated Area							
Side Slopes	575	125	25	71,875		71,875	22,569
Below Base of Unit	575	125	20	71,875		71,875	53,241
Lateral	695	175	45	121,625		121,625	82,917
Subtotal	695	175	45	121,625		121,625	158,727
Other Materials							0
TOTAL			45				202,708

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-1

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden							
Top dimension							
Bottom dimension				71,875			
Subtotal	575	125	0	71,875	1.5	71,875	0
Contaminated Layer							
Side Slopes							
Below Base of Unit							
Lateral							
Subtotal	575	125	25	25,000	1.5	71,875	43,981
Other Materials							0
TOTAL			25				43,981

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden							
Top dimension							
Bottom dimension				151,575			
Subtotal	705	215	0	151,575	1.5	151,575	0
Contaminated Layer							
Side Slopes							
Below Base of Unit							
Lateral							
Subtotal	705	215	30	76,875	1.5	151,575	125,417
Other Materials							0
TOTAL			30				125,417

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden							
Top dimension							
Bottom dimension				257,300			
Subtotal	830	310	0	257,300	1.5	257,300	0
Contaminated Layer							
Side Slopes							
Below Base of Unit							
Lateral							
Subtotal	830	310	45	121,625	1.5	257,300	310,708
Other Materials							0
TOTAL			45				310,708

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-1

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
30	30	1.5	10	40	300	255	25.5	9,274

Sub-Volume I	4,817
Sub-Volume II	3,071
Sub-Volume III	850
Sub-Volume IV	542

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-1

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	100,792 lcy	1800 lcy/shift	56.0	56.0
Other Clean Material	47,200 lcy	1800 lcy/shift	26.2	26.2
Ramp	10,943 lcy	2000 lcy/shift	5.5	5.5
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	158,935 lcy		87.7	87.7

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

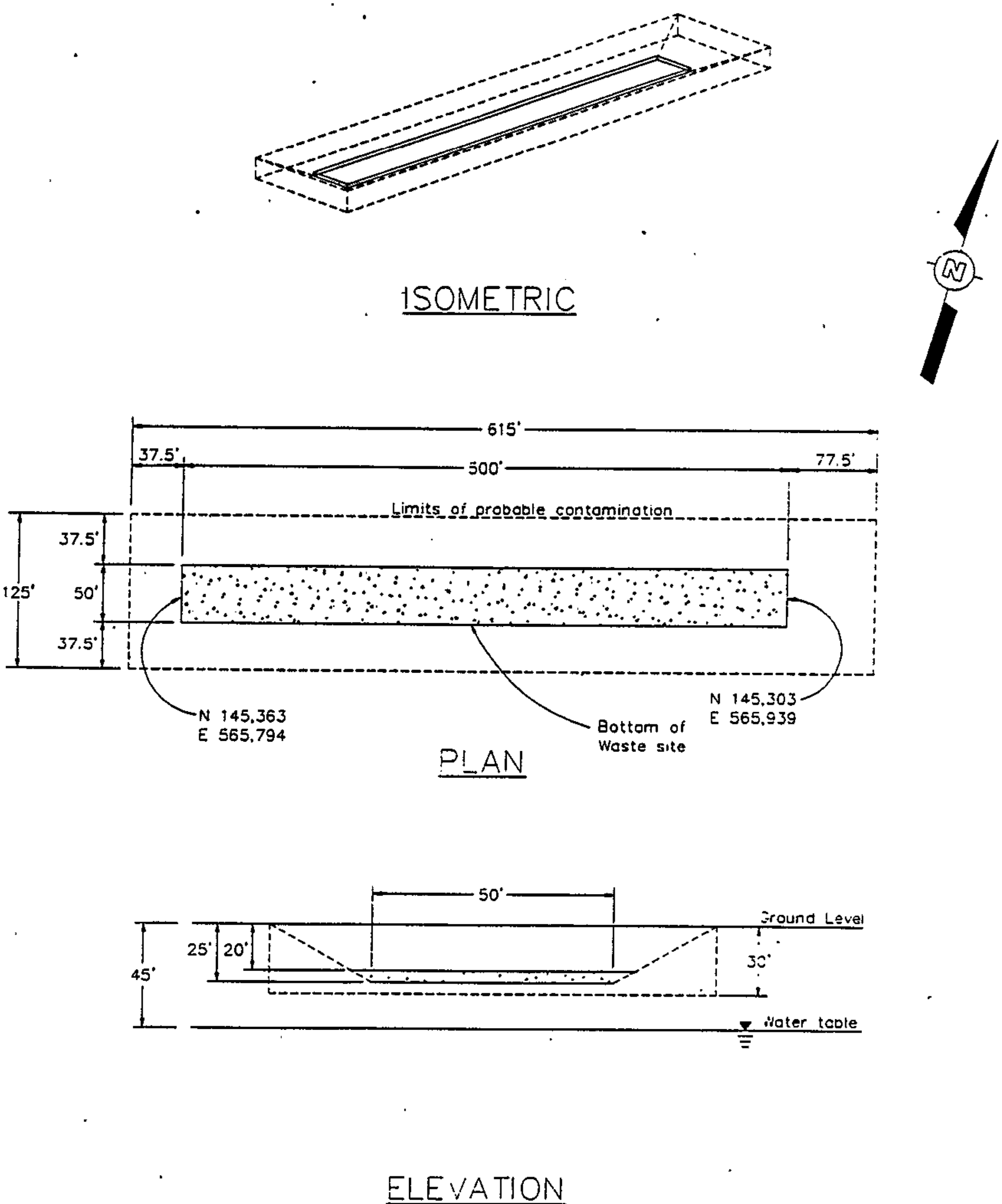
- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.

(3) 1 shift = 7 x 45 minute hours.

(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 116-C-1

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-6
SITE NAME: 105-C Fuel Storage Basin Cleanout Percolation Pond

CONTAMINATED DIMENSION ASSUMPTIONS:

Percolation Pond
- Odd shaped pond with dimensions of:
  100 x 100 x 45 x 50 x 55 x 50
- Depth - Bottom of pond is 6 ft below grade (Ref 1).
- Slopes - 1.0H:1.0V

Contaminated Area -
- North, South, East, West - No lateral contamination.
- Depth -
  - Minimum - No contamination.
  - Probable - No contamination.
  - Maximum - Percolation pond liquids were contaminated and reached groundwater, 95 ft below surface (Ref 6, 7).

Other Materials -
- None present.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 492 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Before discharging to the unit, water was sampled to ensure radionuclide concentrations were below release criteria of DOE Order 5480.1 therefore site should be nonhazardous/nonradioactive.
The percolation pond is not backfilled.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-6

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Pond Material	0	0	0	0	1.0	0	0
Contaminated Area	0	0	0	0		0	0
Other Materials	0	0	0	0		0	0
TOTAL			0				0

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Pond Material	0	0	0	0	1.0	0	0
Contaminated Area	0	0	0	0		0	0
Other Materials	0	0	0	0		0	0
TOTAL			0				0

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Pond Material							
Top Dimensions							
Square Site	112	112	6		1.0	12,544	
Minus Rectangle	50	55	6		0.0	2,750	
Bottom Dimensions							
Square Site	100	100	6	10,000	1.0		
Minus Rectangle	50	55	6	2,750	0.0		
Subtotal				7,250		9,794	1,888
Contaminated Area							
Below Base Unit							
Square Site	112	112	89	12,544	0.0	12,544	41,349
Minus Rectangle	50	55	89	2,750	0.0	2,750	9,065
Minus Pond Void						9,794	1,888
Subtotal				9,794		9,794	30,395
TOTAL			95				32,284

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-6

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Pond Material	0	0	0	0	1.0	0	0
Contaminated Area	0	0	0	0		0	0
Other Materials	0	0	0	0		0	0
TOTAL			0				0

PROBABLE

Unit	Length	Width	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Pond Material	0	0	0	0	1.0	0	0
Contaminated Area	0	0	0	0		0	0
Other Materials	0	0	0	0		0	0
TOTAL			0				0

MAXIMUM

Unit	Length	Width	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Pond Material							
Equivalent Top	384	384				147,429	31,250
Equivalent Bottom	366	366	6	133,930	1.5		
Subtotal			6				31,250
Contaminated Area							
Equivalent Top	366	366				133,930	197,714
Equivalent Bottom	99	99	89	9,794	1.5		
Subtotal			89				197,714
TOTAL			95				228,964

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-6

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	0 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	0 lcy	1500 lcy/shift	0.0	0.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	0 lcy		0.0	0.0

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

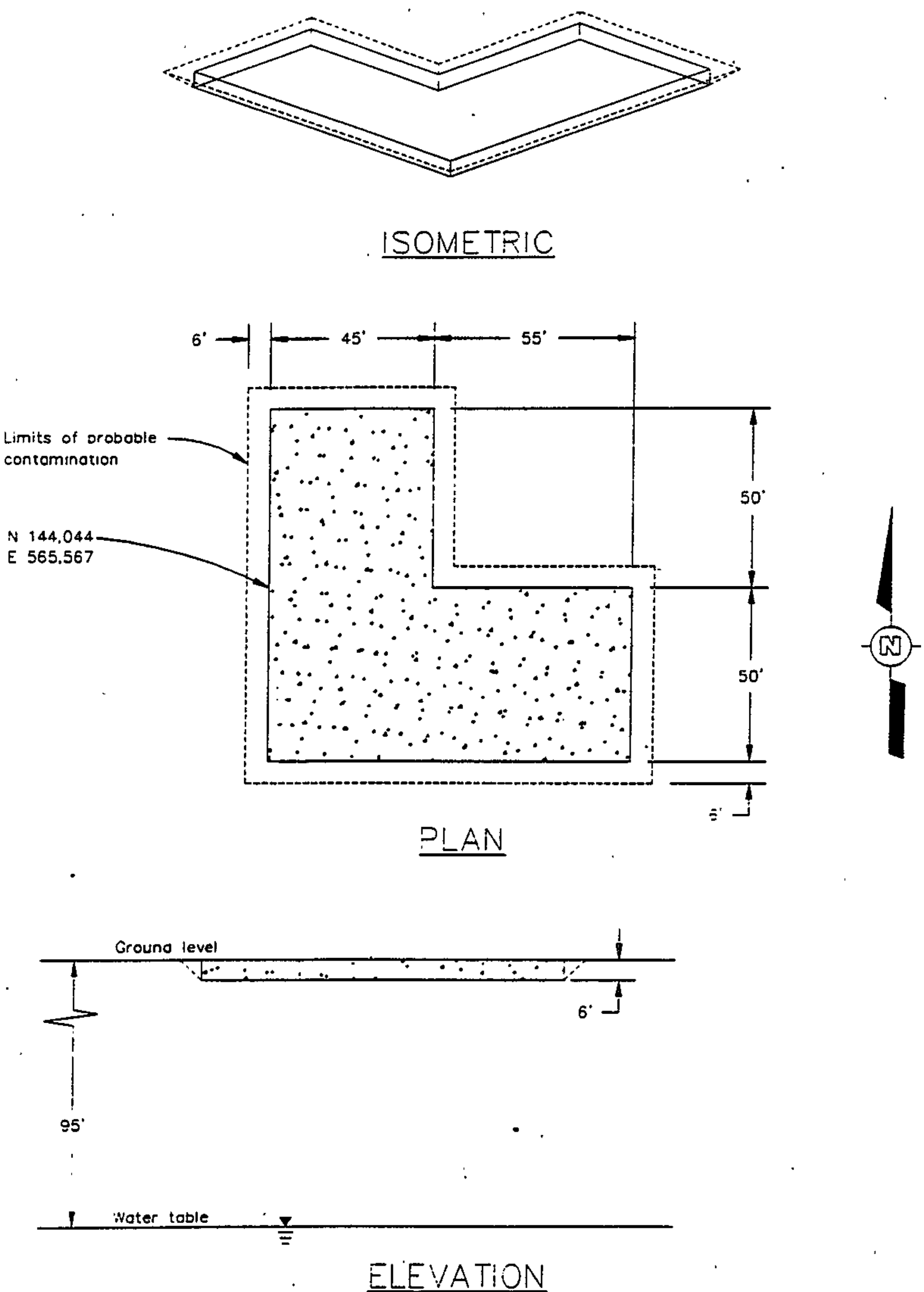
- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.

(3) 1 shift = 7 x 45 minute hours.

(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 116-C-6

Volume Estimate
100 BC Area

SITE NUMBER: None/Effluent Pipeline
SITE NAME: Effluent Pipeline

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -

Process Effluent Pipeline ranges from 18 to 66 in. diameter and has several junction boxes, concrete anchors, and steel clips. Assume 3/8 in thickness for steel and 3 in thickness for concrete. Summary of pipeline diameters and lengths:

18 in steel: 524 ft
24 in steel: 1,520 ft
42 in steel: 1050 ft
48 in RCP: 2,350 ft
54 in steel: 440 ft
60 in steel: 4,900 ft
66 in steel: 10,650 ft

Contaminated Area -

Two documented leaks in Ref 2: junction box (JB) and line leak.
Assume % pipe leakage in probable and maximum cases.
Assume pipeline leaks would have affected the gravel bedding (3 in below, 6 in above, and 2 ft on either side).
Minimum - Two documented leaks.
Probable - Two documented leaks w/spread, 10% of pipeline leaked into soil column, and 100 % of pipeline.
Maximum - 2 documented leaks plus entire length of pipeline leaked to groundwater.

Other Materials -

Junction boxes, concrete anchors, and steel clips were used in conjunction with the pipeline. Volumes not included in calculations.

ELEVATIONS:

Surface Elevation - see Ref 7.
Groundwater - 397 ft average (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5H:1.0V
Average Pipeline depth is 13 ft.
Average depth to groundwater is 63.5 ft from pipe invert and 76.5 ft from surface.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a long cylinder with a trapezoidal contaminated gravel area.
The shape of the excavation is assumed to be that of a long truncated rectangular pyramid.
Assume that the pipe trench was at a 1:1 slope and filled with gravel.
The shape of the line leak, contaminated volume, is assumed to be rectangular.
The shape of the junction box leak is assumed to be that of a truncated rectangular pyramid.

Volume Estimate
100 BC Area

SITE NUMBER: None/Effluent Pipeline

CONTAMINATED VOLUME

PROBABLE

Unit	Length ft	Dia/Wdth ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
J.B. Leak - Soil							
around 54 in	310	94	25.0				26,799
around 66 in							
"top"	183	120	25				
"bottom"	183	22	7				8,535
Subtotal							35,334
Line Leak - Soil: Vol #1	836	146	11	122,056		122,056	49,337
Vol #2	445	153	11	68,085		68,085	27,738
Subtotal				190,141		190,141	77,076
100% of Pipelines							
66 in steel	10,650	5.5	0.0313				212
60 in steel	4,900	5	0.0313				89
54 in steel	440	4.5	0.0313				7
48 in RCP	2,350	4	0.25				256
42 in steel	1,050	3.5	0.0313				13
24 in steel	1,520	2	0.0313				11
18 in steel	524	1.5	0.0313				3
Steel Subtotal							334
Concrete Subtotal							256
10% of Pipelines - Soil					1.0		
66 in - Top Dimension	10,420	22				229,240	
Bottom Dimension	10,420	9.5	6.25	98,990			28,821
60 in - Top Dimension	4,900	20.5				100,450	
Bottom Dimension	4,900	9	5.75	44,100			11,829
54 in - Top Dimension	190	19				3,610	
Bottom Dimension	190	8.5	5.25	1,615			396
48 in - Top Dimension	1,514	17.5				26,495	
Bottom Dimension	1,514	8	4.75	12,112			2,691
42 in - Top Dimension	1,050	16				16,800	
Bottom Dimension	1,050	7.5	4.25	7,875			1,568
24 in - Top Dimension	1,520	11.5				17,480	
Bottom Dimension	1,520	6	2.75	9,120			1,178
18 in - Top Dimension	524	10				5,240	
Bottom Dimension	524	5.5	2.25	2,882			304
10 % Subtotal							4,679
Subtotal - Steel	19,084						334
Subtotal - Concrete	2,350						256
Subtotal - Soil							117,088
TOTAL	21,434						117,679

Volume Estimate
100 BC Area

SITE NUMBER: None/Effluent Pipeline

CONTAMINATED VOLUME, cont.

MAXIMUM

Unit	Length ft	Dia/Wdth ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
J.B. Leak - Soil							
around 54 in line	310	94	58				62,414
around 66 in line							
"top"	183	120	58				
"bottom"	183	22	52				26,638
Subtotal							89,053
Line Leak - Soil: Vol #1	836	146	52	122,056		122,056	234,682
Vol #2	445	153	52	68,085		68,085	131,127
Subtotal				190,141		190,141	365,808
100% of Pipelines							
Steel Subtotal							334
Concrete Subtotal							256
10% of Pipelines - Soil					1.0		
66 in - Top Dimension	10,420	148.5				1,547,370	
Bottom Dimension	10,420	9.5	69.5	98,990			2,109,757
60 in - Top Dimension	4,900	147				720,300	
Bottom Dimension	4,900	9	69	44,100			973,170
54 in - Top Dimension	190	145.5				27,645	
Bottom Dimension	190	8.5	68.5	1,615			37,005
48 in - Top Dimension	1,514	144				218,016	
Bottom Dimension	1,514	8	68	12,112			289,086
42 in - Top Dimension	1,050	142.5				149,625	
Bottom Dimension	1,050	7.5	67.5	7,875			196,501
24 in - Top Dimension	1,520	143				217,360	
Bottom Dimension	1,520	6	68.5	9,120			287,117
18 in - Top Dimension	524	136.5				71,526	
Bottom Dimension	524	5.5	65.5	2,882			90,220
10 % Subtotal							398,286
Subtotal - Steel	19,084						334
Subtotal - Concrete	2,350						256
Subtotal - Soil							853,147
TOTAL	21,434						853,737

Volume Estimate
100 BC Area

SITE NUMBER: None/Effluent Pipeline

CONTAMINATED VOLUME, cont.

MINIMUM

Unit	Length ft	Dia/Wdth ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
J.B. Leak - Pipeline							
54 in diameter	250	4.5	0.0313				4
66 in diameter	230	5.5	0.0313				5
Subtotal	480						9
J.B. Leak - Soil							
Around 54 in					1.0		
Top Dimension	250	19				4,750	
Bottom Dimension	250	8.5	5.3	2,125			668
Subtotal (- pipe volume)							521
Around 66 in					1.0		
Top Dimension	230	22				5,060	
Bottom Dimension	230	9.5	6.3	2,185			839
Subtotal							636
Subtotal Sum							1,157
Line Leak - Pipeline							
48 in diameter	836	4.0	0.25				91
– Subtotal	836						91
Line Leak - Soil					1.0		
Volume #1	836	146	6				27,124
Volume #2	445	153	6.0				15,130
Subtotal							42,254
TOTAL - Soil							43,411
TOTAL - Concrete	836	4.0	0.25				91
TOTAL - Steel	480	4.5 - 5.5	0.0313				9

Volume Estimate
100 BC Area

SITE NUMBER: None/Effluent Pipeline

EXCAVATED VOLUME

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
J.B. Leak - soil							
Around 54 in					1.5		
Overburden	385	169	14	65,065		90,097	40,075
Volume around pipe	310	94	25	29,140		65,065	42,563
Subtotal	427	211	39	29,140		90,097	82,638
Around 66 in					1.5		
Overburden	258	195	14	50,310		71,100	31,324
Volume around pipe	183	120	25	21,960		50,310	32,429
Subtotal	300	237	39	21,960		71,100	63,753
Subtotal Sum				173,655			146,391
Line Leak - soil					1.5		
Overburden	863	173	2	149,299		155,551	11,290
Volume around pipe	836	146	9	122,056		149,299	44,796
Subtotal	869	179	11	122,056		155,551	56,087
Other Volume					1.5		
Top Dimension	478	186	11			88,908	
Bottom Dimension	445	153	11	68,085			31,906
Subtotal Sum							87,993
Pipeline Excavation					1.5		
66 - overburden	10,420	58.5	5	453,270		609,570	98,411
-Vol around pipe/top	10,420	43.5	8			453,270	
bottom	10,420	19.5	13	203,190			88,084
60 - overburden	4,900	58.0	5	210,700		284,200	45,824
-Vol around pipe/top	4,900	43.0	8			210,700	
bottom	4,900	19.0	13	93,100			40,696
54 - overburden	190	57.5	5	8,075		10,925	1,759
-Vol around pipe/top	190	42.5	8			8,075	
bottom	190	18.5	13	3,515			1,550
48 - overburden	1,514	57.0	5	63,588		86,298	13,878
-Vol around pipe/top	1,514	42.0	8			63,588	
bottom	1,514	18.0	13	27,252			12,126
42 - overburden	1,050	56.5	5	43,575		59,325	9,528
-Vol around pipe/top	1,050	41.5	8			43,575	
bottom	1,050	17.5	13	18,375			8,254
24 - overburden	1,520	55.0	5	60,800		83,600	13,370
-Vol around pipe/top	1,520	40.0	8			60,800	
bottom	1,520	16.0	13	24,320			11,273
18 - overburden	524	54.5	5	20,698		28,558	4,561
-Vol around pipe/top	524	39.5	8			20,698	
bottom	524	15.5	13	8,122			3,809
Subtotal							353,122
TOTAL							587,506

Volume Estimate
100 BC Area

SITE NUMBER: None/Effluent Pipeline

EXCAVATED VOLUME, cont.

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
J.B. Leak - soil							
Overburden	484	451	5	204,484	1.5	218,284	
Top Dimension	469	436				204,484	39,138
Bottom Dimension	310	277	53	85,870			276,524
Subtotal	484	451	58				315,662
Line Leak - soil					1.5		
Overburden	992	455	5	429,880		451,360	
Top Dimension	977	440				429,880	81,589
Bottom Dimension	836	299	47	249,964			585,559
Subtotal Sum	992	455	52				667,148
Pipeline Excavation					1.5		
66 - overburden	10,420	228	5	2,219,460		2,375,760	425,483
-Vol around pipe/top	10,420	213	65			2,219,460	
bottom	10,420	20	70	203,190			2,884,552
60 - overburden	4,900	226	5	1,033,900		1,107,400	198,269
-Vol around pipe/top	4,900	211	64			1,033,900	
bottom	4,900	19	69	93,100			1,331,392
54 - overburden	190	400	5	39,710		75,905	10,705
-Vol around pipe/top	190	209	64			39,710	
bottom	190	19	69	3,515			50,662
48 - overburden	1,514	396	5	313,398		599,544	84,532
-Vol around pipe/top	1,514	207	63			313,398	
bottom	1,514	18	68	27,252			396,093
42 - overburden	1,050	393	5	215,250		412,125	58,090
-Vol around pipe/top	1,050	205	63			215,250	
bottom	1,050	18	67.5	18,375			269,475
24 - overburden	1,520	397	5	313,880		603,440	84,937
-Vol around pipe/top	1,520	207	64			313,880	
bottom	1,520	16	68.5	24,320			396,361
18 - overburden	524	379	5	103,228		198,334	27,922
-Vol around pipe/top	524	197	61			103,228	
bottom	524	16	66	8,122			124,292
Subtotal							6,342,765
TOTAL							7,325,576

Volume Estimate
100 BC Area

SITE NUMBER: None/Effluent Pipeline

EXCAVATED VOLUME, cont.

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
J.B. Leak							
Around 54 in					1.5		
Overburden	264	22	19	5,797		24,723	10,104
Volume around pipe	250	8.5	5	2,125		5,797	508
Subtotal	319	78	23	2,125		24,723	10,612
Around 66 in					1.5		
Overburden	247	26	18	6,409		23,472	9,386
Volume around pipe	230	9.5	6	2,185		6,409	664
Subtotal	299	79	23	2,185		23,472	10,252
Subtotal Sum							20,864
Line Leak							
Overburden	848	158	2	133,984	1.5	140,056	10,149
Volume around pipe	836	146	4	122,056		133,984	18,573
Subtotal	854	164	6	122,056		140,056	28,722
Other Volume							
Overburden	457	165	2	75,405	1.5	79,173	5,725
Bottom Dimension	445	153	4	68,085		75,405	10,418
Subtotal	463	171	6	68,085		79,173	16,143
TOTAL							65,729

Volume Estimate
100 BC Area

SITE NUMBER: None/Effluent Pipeline

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
23	5	1.5	10	40	50	42.5	4.25	174

Sub-Volume I	134
Sub-Volume II	14
Sub-Volume III	24
Sub-Volume IV	3

NOTES:

See figure for ramp dimension and sub-volume definitions.

Number of ramps required: 14
Total ramp volume: 2438 bcy

Volume Estimate
100 BC Area

SITE NUMBER: None/Effluent Pipeline

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	318,625 lcy	2000 lcy/shift	159.3	159.3
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	152,983 lcy	1800 lcy/shift	85.0	85.0
Other Clean Material	236,468 lcy	1800 lcy/shift	131.4	131.4
Ramp	2,877 lcy	2000 lcy/shift	1.4	1.4
Misc Material Handling				
Metals Demolition	2,207 tons	100 ton/shift	22.1	22.1
Metals Loading	2,207 tons	900 ton/shift	2.5	2.5
Concrete Demolition	410 lcy	200 lcy/shift	2.1	2.1
Concrete Loading	410 lcy	1500 lcy/shift	0.3	0.3
Pipeline Removal	21,434 ft	1000 ft/shift	21.4	21.4
TOTAL	710,952 lcy		425.4	425.4

NOTES:

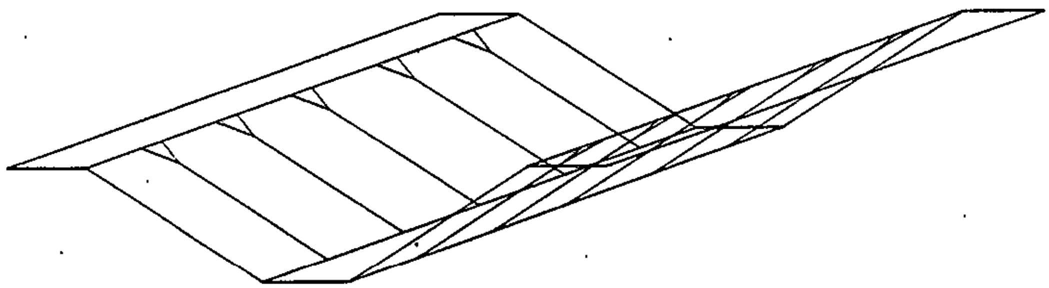
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

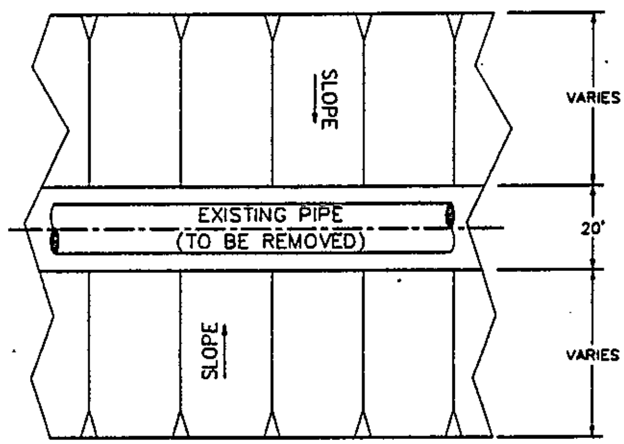
- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

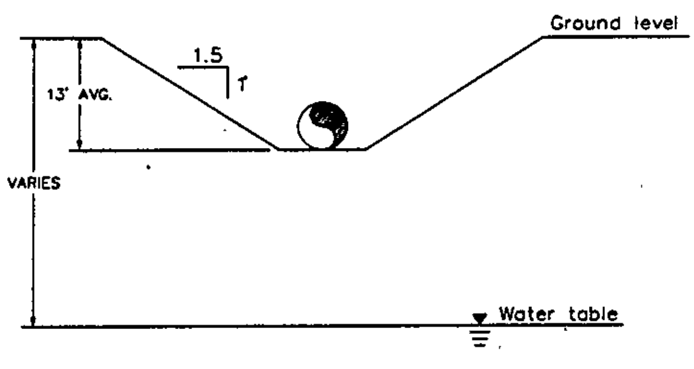
(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



ISOMETRIC



PLAN



ELEVATION

SCALE: NONE WASTE SITE–EFFLUENT TRENCH

PIPELINE

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-3
SITE NAME: 105-B Pluto Crib

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
Length - 10 ft (Ref 1), assume base length of 10 ft.
Width - 10 ft (Ref 1), assume base width of 10 ft.
Depth - The crib structure measures 10 ft in depth (Ref 2).
Slopes - The crib was built with vertical walls, timber reinforced.
The crib was covered (backfilled) with soil after use (Ref 4). Assume top of crib 3 ft below land surface.

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - Only crib.
Probable - Crib and 5 ft of substrate below the base of the crib.
Maximum - Crib and substrate below the base of the crib to groundwater, 72 ft (Ref 1).

Other Materials -
Timbers probably present, volume not calculated.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-3

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill	10	10	10	100	100	37
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			10			37

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill	10	10	10	100	100	37
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	10	10	5	100	100	19
Subtotal	10	10	5	100	100	19
Concrete						0
Other Materials						0
TOTAL			15			56

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill.	10	10	10	100	100	37
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	10	10	59	100	100	219
Subtotal	10	10	59	100	100	219
Concrete						0
Other Materials						0
TOTAL			69			256

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-3

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	49	49	3	1,600	1.5	2,401	221
Crib Fill	40	40	10	100	1.5	1,600	259
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			13				480

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	64	64	3	3,025	1.5	4,096	394
Crib Fill	55	55	10	625	1.5	3,025	620
Contaminted Area							
Lateral				0			
Below Base of Unit	25	25	5	100	1.5	625	60
Subtotal	25	25	5	100	1.5	625	60
Concrete							0
Other Materials							0
TOTAL			18				1,075

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	226	226	3	47,089	1.5	51,076	5,452
Crib Fill	217	217	10	34,969	1.5	47,089	15,140
Contaminted Area							
Lateral				0			
Below Base of Unit	187	187	59	100	1.5	34,969	26,906
Subtotal	187	187	59	100	1.5	34,969	26,906
Concrete							0
Other Materials							0
TOTAL			72				47,499

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-3

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	66 lcy	1700 lcy/shift	0.0	0.0
Other Clean Material	1,203 lcy	1700 lcy/shift	0.7	0.7
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	1,268 lcy		0.7	1.0

NOTES:

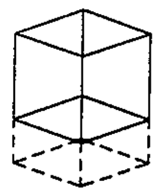
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



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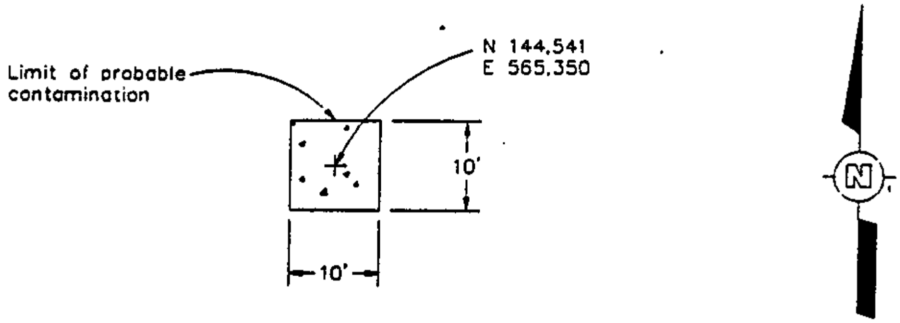

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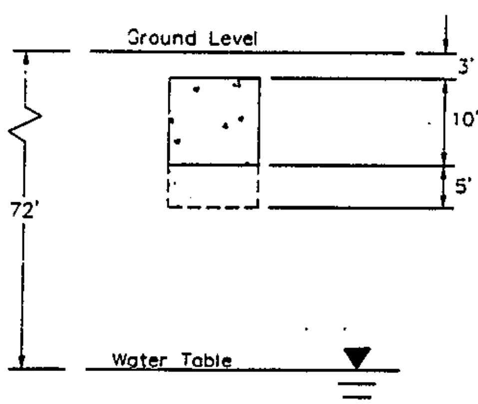

ELEVATION

SCALE: NONE

WASTE SITE 116-B-3

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-4
SITE NAME: 105-B Dummy Decontamination French Drain

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
- Diameter - 4 ft (Ref 1), assume 4 ft.
- Depth - 20 ft (Ref 1), assume 20 ft.The crib structure measures 10 ft in depth (Ref 2).
- Slopes - The unit was built with vertical walls, unknown reinforcing.
- The unit has a graded rock and sand bottom (Ref 1). It is assumed that it has been backfilled to the surface.

Contaminated Area -
- North, South, East, West - Assume no lateral dispersion.
- Depth -
  - Minimum - Only unit and material to surface.
  - Probable - From surface to 5 ft below base of unit.
  - Maximum - From surface to groundwater, 71 ft (Ref 1).

Other Materials -
- Supporting materials probably present, volume not calculated.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a regular cylinder.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-4

CONTAMINATED VOLUME

MINIMUM

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Drain Fill	4	13	20.0	13	13	9
Contaminted Area						
Lateral	0	0	0.0	0	0	0
Below Base of Unit	0	0	0.0	0	0	0
Subtotal	0	0	0.0	0	0	0
Concrete						0
Other Materials						0
TOTAL			20.0			9

PROBABLE

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Drain Fill	4	13	20.0	13	13	9
Contaminted Area						
Lateral	0	0	0.0	0	0	0
Below Base of Unit	4	13	5.0	13	13	2
Subtotal	4	13	5.0	13	13	2
Concrete						0
Other Materials						0
TOTAL			25.0			12

MAXIMUM

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Drain Fill	4	13	20.0	13	13	9
Contaminted Area						
Lateral	0	0	0.0	0	0	0
Below Base of Unit	4	13	51.0	13	13	24
Subtotal	4	13	51.0	13	13	24
Concrete						0
Other Materials						0
TOTAL			71.0			33

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-4

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	64	64	0.0	4,096	1.5	4,096	0
Drain Fill	64	64	20.0	13	1.5	4,096	1,078
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			0
Concrete							0
Other Materials							0
TOTAL			20.0				1,078

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	79	79	0.0	6,241	1.5	6,241	0
Drain Fill	79	79	20.0	361	1.5	6,241	2,001
Contaminted Area							
Lateral				0			
Below Base of Unit	19	19	5.0	13	1.5	361	34
Subtotal	19	19	5.0	13	1.5	361	34
Concrete							0
Other Materials							0
TOTAL			25.0				2,035

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	217	217	0.0	47,089	1.5	47,089	0
Drain Fill	217	217	20.0	24,649	1.5	47,089	26,125
Contaminted Area							
Lateral				0			
Below Base of Unit	157	157	51.0	13	1.5	24,649	16,358
Subtotal	157	157	51.0	13	1.5	24,649	16,358
Concrete							0
Other Materials							0
TOTAL			71.0				42,484

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-4

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	14 lcy	1700 lcy/shift	0.0	0.0
Other Clean Material	2,387 lcy	1700 lcy/shift	1.4	1.4
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	2,401 lcy		1.4	1.4

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

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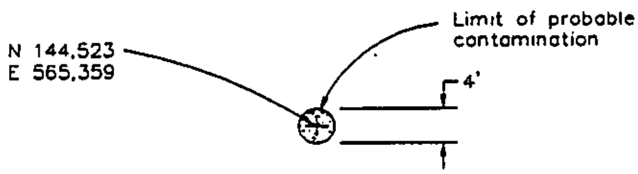

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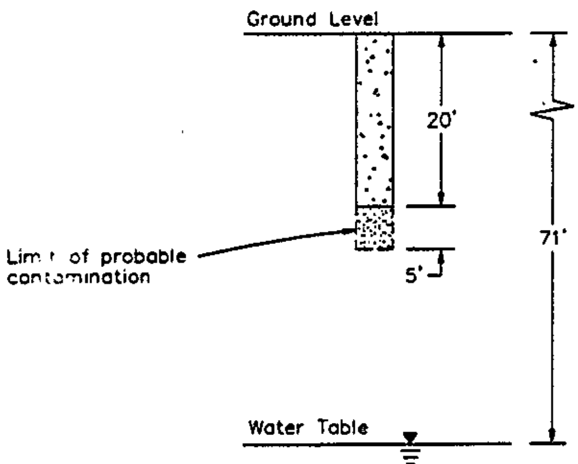


ELEVATION

SCALE: NONE

WASTE SITE 116-B-4

Volume Estimate
100 BC Area

SITE NUMBER 116-B-6A
SITE NAME 116-B-6-1, 111-B-1 Crib

CONTAMINATED DIMENSION ASSUMPTIONS:

Crib
Length - 12 ft (Ref 1,5), assume base length of 12 ft
Width - 8 ft (Ref 1), 12 ft (Ref 5), assume base width of 12 ft
Depth - 15 ft (Ref 1), 8 ft (Ref 5), assume 8 ft depth.
Slopes - The crib was built with vertical walls, timber reinforced.
The crib was covered (backfilled) with 6 ft of soil (Ref 5).

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - Assume no contamination.
Probable - 5 ft of substrate below the base of the crib.
Maximum - Substrate below the base of the crib to groundwater, 82 ft below grade (Ref 6, 7), 68 ft below base of crib.

Other Materials -
Timbers probably present, volume not calculated. Site was vitrified in 1990.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 479 ft (Ref 7)
Groundwater -397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Vitrified soil and crib material is not included in contaminated volume.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-6A

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill	12	12	0	144	144	0
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			0			0

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill	12	12	0	144	144	0
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	12	12	5	144	144	27
Subtotal	12	12	5	144	144	27
Concrete						0
Other Materials						0
TOTAL			5			27

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill	12	12	0	144	144	0
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	12	12	68	144	144	363
Subtotal	12	12	68	144	144	363
Concrete						0
Other Materials						0
TOTAL			68			363

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-6A

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	12	12	0	144	1.5	144	0
Crib Fill, Clean	12	12	0	144	1.5	144	0
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			0				0

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	69	69	6	2,601	1.5	4,761	806
Crib Fill, Clean	51	51	8	729	1.5	2,601	465
Contaminted Area							
Lateral				0			
Below Base of Unit	27	27	5	144	1.5	729	74
Subtotal	27	27	5	144	1.5	729	74
Concrete							0
Other Materials							0
TOTAL			19				1,345

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	258	258	6	57,600	1.5	66,564	13,784
Crib Fill, Clean	240	240	8	46,656	1.5	57,600	15,417
Contaminted Area							
Lateral				0			
Below Base of Unit	216	216	68	144	1.5	46,656	41,465
Subtotal	216	216	68	144	1.5	46,656	41,465
Concrete							0
Other Materials							0
TOTAL			82				70,666

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-6A

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	31 lcy	1700 lcy/shift	0.0	0.0
Other Clean Material	1,555 lcy	1700 lcy/shift	0.9	0.9
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	1,587 lcy		0.9	1.0

NOTES:

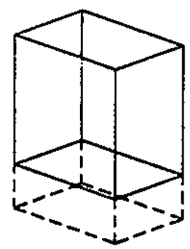
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



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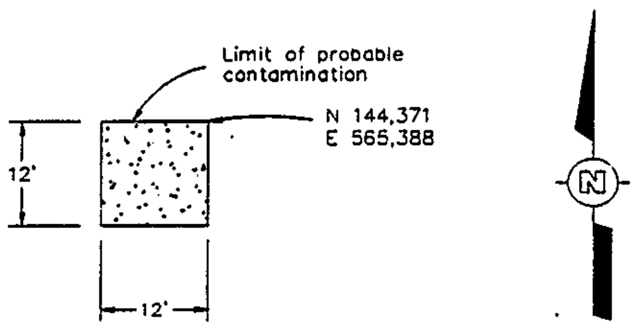

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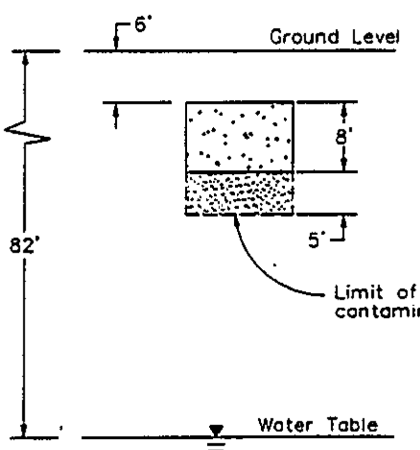

ELEVATION

SCALE: NONE

WASTE SITE 116-B-6A

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-6B
SITE NAME: 116-B-6-2, 111-B-2 Crib

CONTAMINATED DIMENSION ASSUMPTIONS:

Crib
- Length - 8 ft (Ref 1), assume base length of 8 ft
- Width - 4 ft (Ref 1), assume base width of 4 ft
- Depth - 8 ft (Ref 1), assume 8 ft depth.
- Slopes - The crib was built with vertical walls.
- Assume the Crib was covered (backfilled) with 5 ft of soil.

Contaminated Area -
- North, South, East, West - Assume no lateral dispersion.
- Depth -
  - Minimum - Only crib.
  - Probable - Crib and 5 ft of substrate below the base of the crib.
  - Maximum - Crib and substrate below the base of the crib to groundwater, 61 ft (Ref 1), 82 ft (Ref 6,7), assume 82 ft to groundwater from surface.

Other Materials -
- Timbers may have been present, volume not calculated.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 479 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-6B

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Crib Fill	8	4	8	32	32	9
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete	0	0	0	0	0	0
Other Materials	0	0	0	0	0	0
TOTAL			8			0

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Crib Fill	8	4	8	32	32	9
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	8	4	5	32	32	6
Subtotal	8	4	5	32	32	6
Concrete	0	0	0	0	0	0
Other Materials	0	0	0	0	0	0
TOTAL			13			15

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Crib Fill	8	4	8	32	32	9
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	8	4	69	32	32	82
Subtotal	8	4	69	32	32	82
Concrete						0
Other Materials						0
TOTAL			77			91

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-6B

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	47	43	5	896	1.5	2,021	152
Crib Fill	32	28	8	32	1.5	896	109
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			8				261

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	62	58	5	2,021	1.5	3,596	513
Crib Fill	47	43	8	437	1.5	2,021	336
Contaminted Area							
Lateral				0			
Below Base of Unit	23	19	5	32	1.5	437	36
Subtotal	23	19	5	32	1.5	437	36
Concrete							0
Other Materials							0
TOTAL			18				885

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	254	250	5	56,165	1.5	63,500	11,073
Crib Fill	239	235	8	45,365	1.5	56,165	15,013
Contaminted Area							
Lateral				0			
Below Base of Unit	215	211	69	32	1.5	45,365	39,757
Subtotal	215	211	69	32	1.5	45,365	39,757
Concrete							0
Other Materials							0
TOTAL			82				65,843

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Volume Estimate
100 BC Area

SITE NUMBER: 116-B-6B

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	18 lcy	1700 lcy/shift	0.0	0.0
Other Clean Material	1,027 lcy	1700 lcy/shift	0.6	0.6
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	1,045 lcy		0.6	1.0

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

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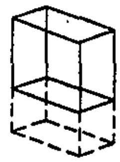

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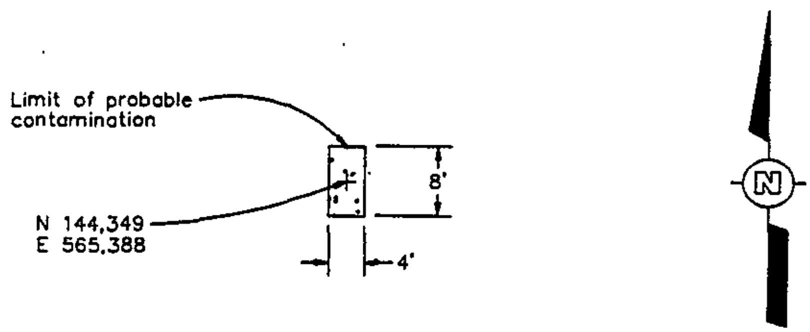

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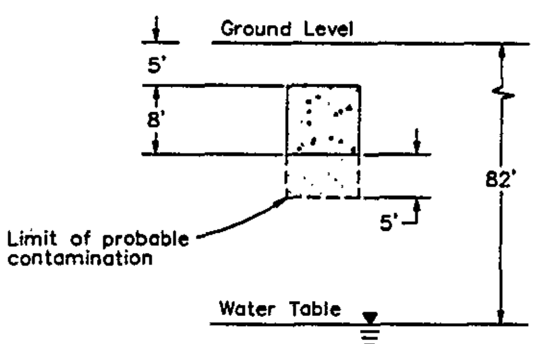


ELEVATION

SCALE: NONE

WASTE SITE 116–B–6B

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-9
SITE NAME: 104-B-2 French Drain

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
Diameter - 4 ft (Ref 1), assume 4 ft.
Depth - 3 ft (Ref 1), assume 3 ft.
Slopes - The unit was built with vertical walls, unknown reinforcing.
It is assumed that it has been backfilled to the surface

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - Only unit.
Probable - Unit and 5 ft of substrate below its base.
Maximum - Unit and substrate below its base to groundwater, 69 ft (Ref 1).

Other Materials -
Supporting materials probably present, volume not calculated.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 466 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a regular cylinder.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-9

CONTAMINATED VOLUME

MINIMUM

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Drain Fill	4	13	3.0	13	13	1
Contaminated Area						
Lateral	0	0	0.0	0	0	0
Below Base of Unit	0	0	0.0	0	0	0
Subtotal	0	0	0.0	0	0	0
Concrete						0
Other Materials						0
TOTAL			3.0			1

PROBABLE

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Drain Fill	4	13	3.0	13	13	1
Contaminated Area						
Lateral	0	0	0.0	0	0	0
Below Base of Unit	4	13	5.0	13	13	2
Subtotal	4	13	5.0	13	13	2
Concrete						0
Other Materials						0
TOTAL			8.0			4

MAXIMUM

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Drain Fill	4	13	3.0	13	13	1
Contaminated Area						
Lateral	0	0	0.0	0	0	0
Below Base of Unit	4	13	58.0	13	13	27
Subtotal	4	13	58.0	13	13	27
Concrete						0
Other Materials						0
TOTAL			61.0			28

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-9

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	13.0	13.0	0.0	169	1.5	169	0
Drain Fill	13.0	13.0	3.0	13	1.5	169	9
Contaminated Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			3.0				9

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	28.0	28.0	0.0	784	1.5	784	0
Drain Fill	28.0	28.0	3.0	361	1.5	784	62
Contaminated Area							
Lateral				0			
Below Base of Unit	19.0	19.0	5.0	13	1.5	361	28
Subtotal	19.0	19.0	5.0	13	1.5	361	28
Concrete							0
Other Materials							0
TOTAL			8.0				90

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	211.0	211.0	0.0	44,521	1.5	44,521	0
Drain Fill	211.0	211.0	3.0	40,804	1.5	44,521	4,739
Contaminated Area							
Lateral				0			
Below Base of Unit	202.0	202.0	66.0	13	1.5	40,804	33,918
Subtotal	202.0	202.0	66.0	13	1.5	40,804	33,918
Concrete							0
Other Materials							0
TOTAL			69.0				38,656

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-9

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	4 lcy	1700 lcy/shift	0.0	0.0
Other Clean Material	102 lcy	1700 lcy/shift	0.1	0.1
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	106 lcy		0.1	1.0

NOTES:

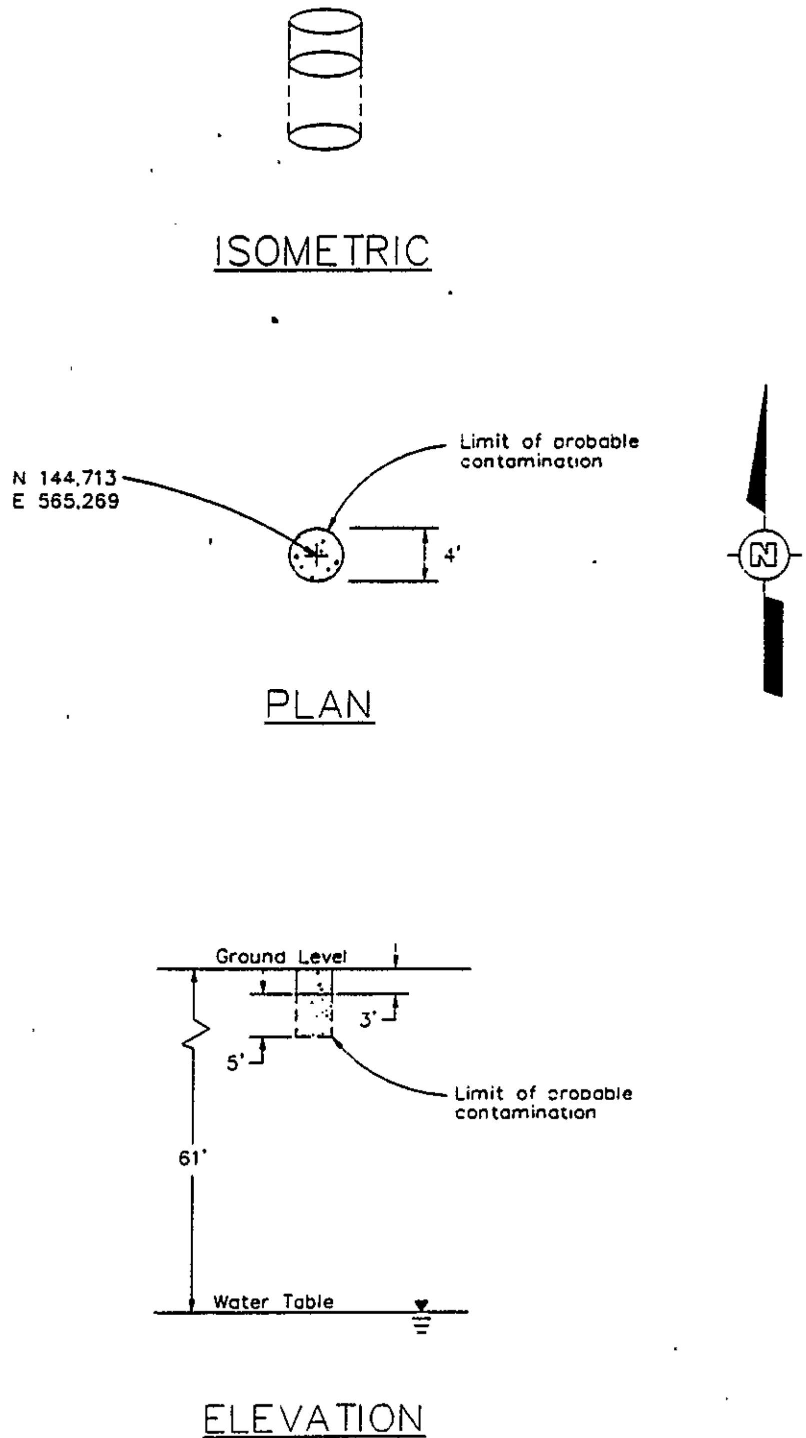
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 116-B-9

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-10
SITE NAME: 108-B Dry Well, Quench Tank

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
Diameter - 3 ft (Ref 1), assume 3 ft.
Depth - 7 ft (Ref 1), assume 7 ft.
Slopes - The unit was built with vertical walls, and is composed of tile and concrete.
It is assumed that the well has been backfilled to the surface and is covered with 1 ft of clean fill.

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - Only unit.
Probable - Unit and 5 ft of substrate below its base.
Maximum - Unit and substrate below its base to groundwater, 61 ft (Ref 1).

Other Materials -
Supporting materials present, volume not calculated.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a regular cylinder.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-10

CONTAMINATED VOLUME

MINIMUM

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Drain Fill	3	7	7.0	7	7	2
Contaminted Area						
Lateral	0	0	0.0	0	0	0
Below Base of Unit	0	0	0.0	0	0	0
Subtotal	0	0	0.0	0	0	0
Concrete						0
Other Materials						0
TOTAL			7.0			2

PROBABLE

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Drain Fill	3	7	7.0	7	7	2
Contaminted Area						
Lateral	0	0	0.0	0	0	0
Below Base of Unit	3	7	5.0	7	7	1
Subtotal	3	7	5.0	7	7	1
Concrete						0
Other Materials						0
TOTAL			12.0			3

MAXIMUM

Unit	Diameter ft	Area sf	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Drain Fill	3	7	7.0	7	7	2
Contaminted Area						
Lateral	0	0	0.0	0	0	0
Below Base of Unit	3	7	53.0	7	7	14
Subtotal	3	7	53.0	7	7	14
Concrete						0
Other Materials						0
TOTAL			60.0			16

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-10

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	27	27	1.0	576	1.5	729	24
Drain Fill	24	24	7.0	7	1.5	576	57
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			8.0				81

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	42	42	1.0	1,521	1.5	1,764	61
Drain Fill	39	39	7.0	324	1.5	1,521	220
Contaminted Area							
Lateral				0			
Below Base of Unit	18	18	5.0	7	1.5	324	26
Subtotal	18	18	5.0	7	1.5	324	26
Concrete							0
Other Materials							0
TOTAL			13.0				281

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	186	186	1.0	33,489	1.5	34,596	1,261
Drain Fill	183	183	7.0	26,244	1.5	33,489	7,724
Contaminted Area							
Lateral				0			
Below Base of Unit	162	162	53.0	7	1.5	26,244	17,715
Subtotal	162	162	53.0	7	1.5	26,244	17,715
Concrete							0
Other Materials							0
TOTAL			61.0				26,700

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-10

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	4 lcy	1700 lcy/shift	0.0	0.0
Other Clean Material	328 lcy	1700 lcy/shift	0.2	0.2
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	331 lcy		0.2	1.0

NOTES:

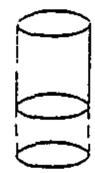
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

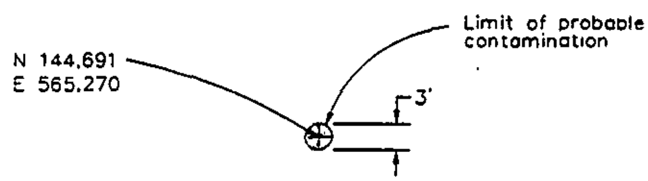
- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

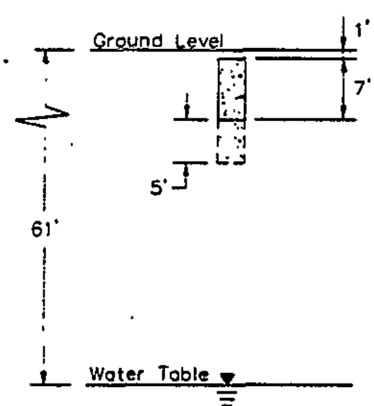
(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



ISOMETRIC



PLAN



ELEVATION

SCALE: NONE

WASTE SITE 116-B-10

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-12
SITE NAME: 117-B Crib

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
Length - 10 ft (Ref 1), assume base length of 10 ft
Width - 10 ft (Ref 1), assume base width of 10 ft
Depth - The crib structure measures 10 ft in depth (Ref 2).
Slopes - The crib was built with vertical walls, timber reinforced.
The crib was covered (backfilled) to grade with soil after use (Ref 4). Assume top of crib 6 ft below land surface.

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - Only crib.
Probable - Crib and 5 ft of substrate below the base of the crib.
Maximum - Crib and substrate below the base of the crib to groundwater, 58 ft (Ref 1).

Other Materials -
Timbers may be present, volume not calculated.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-12

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill	10	10	10	100	100	37
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			10			37

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill	10	10	10	100	100	37
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	10	10	5	100	100	19
Subtotal	10	10	5	100	100	19
Concrete						0
Other Materials						0
TOTAL			15			56

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill	10	10	10	100	100	37
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	10	10	42	100	100	156
Subtotal	10	10	42	100	100	156
Concrete						0
Other Materials						0
TOTAL			52			193

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-12

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	58	58	6	1,600	1.5	3,364	540
Crib Fill	40	40	10	100	1.5	1,600	259
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			0
Concrete							0
Other Materials							0
TOTAL			16				799

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	73	73	6	3,025	1.5	5,329	916
Crib Fill	55	55	10	625	1.5	3,025	620
Contaminted Area							
Lateral				0			
Below Base of Unit	25	25	5	100	1.5	625	60
Subtotal	25	25	5	100	1.5	625	60
Concrete							0
Other Materials							0
TOTAL			21				1,597

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	184	184	6	27,556	1.5	33,856	6,812
Crib Fill	166	166	10	18,496	1.5	27,556	8,473
Contaminted Area							
Lateral				0			
Below Base of Unit	136	136	42	100	1.5	18,496	10,348
Subtotal	136	136	42	100	1.5	18,496	10,348
Concrete							0
Other Materials							0
TOTAL			58				25,632

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-12

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	66 lcy	1700 lcy/shift	0.0	0.0
Other Clean Material	1,819 lcy	1700 lcy/shift	1.1	1.1
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	1,884 lcy		1.1	1.1

NOTES:

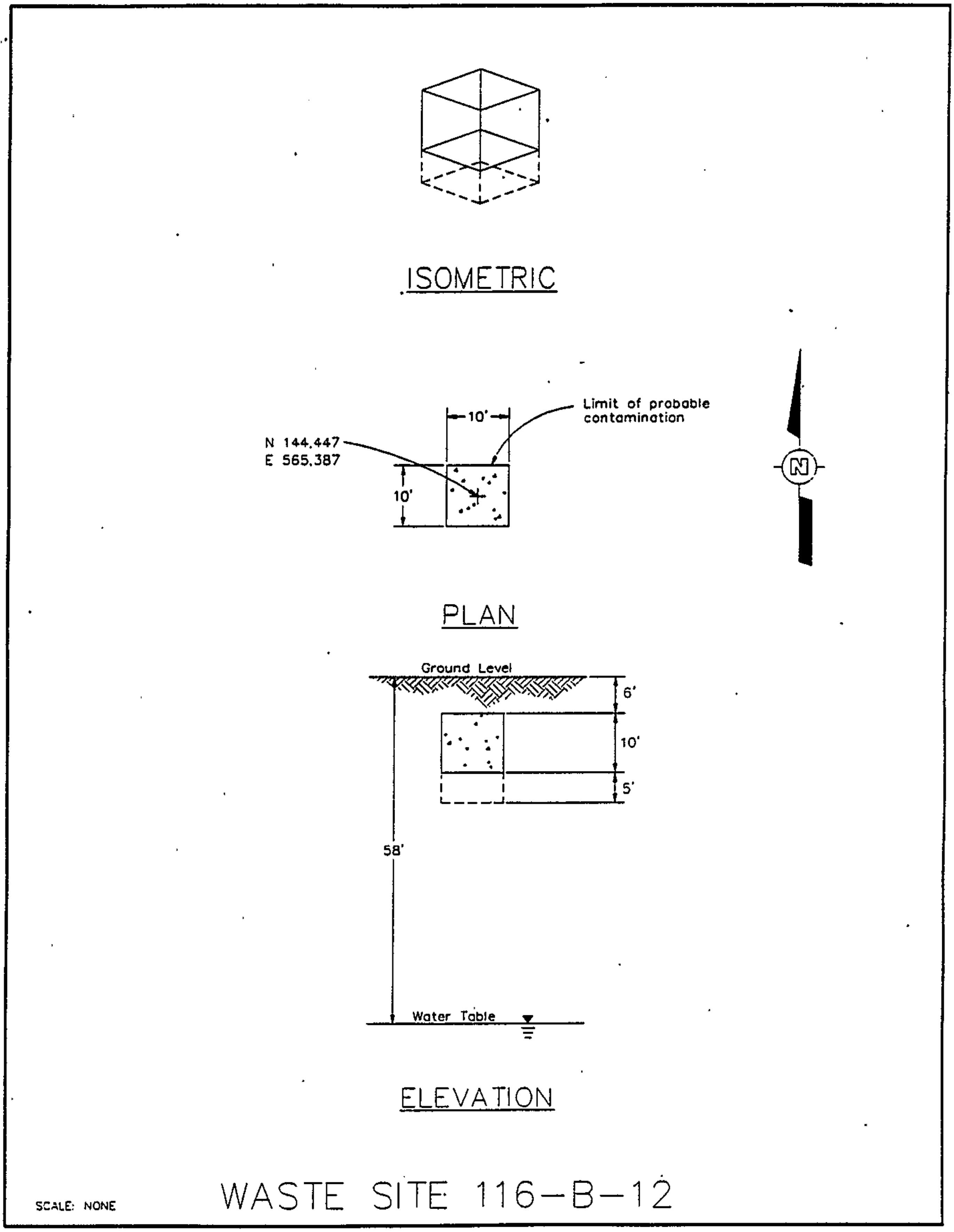
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.


ISOMETRIC
Limit of probable contamination
10'
N 144,447
E 565,387
10'
N
PLAN
Ground Level
6'
10'
5'
58'
Water Table
ELEVATION
SCALE: NONE
WASTE SITE 116-B-12

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-5
SITE NAME: 108-B Crib

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
Length - 84 ft (Ref 1); assume base length of 84 ft.
Width - 16 ft (Ref 1); assume base width of 16 ft.
Depth - Bottom of unit is 11.5 ft below grade (Ref 4). The unit is comprised of the following:

0 - 2 ft	Boiler ash
2 - 2.2 ft	Concrete
2.2 - 6.6 ft	Void
6.6 - 10 ft	Sandy gravel fill
10 - 11.5 ft	Boiler ash

Slopes - 1.0H:1.0V

Contaminated Area -
North, South, East, West - No lateral contamination.
Depth -
Minimum - The gravel and ash material within the unit.
Probable - Gravel and ash material within unit plus substrate contaminated to a depth of 5 ft below the base of the unit.
Maximum - Trench filled to concrete layer (9.3 ft above base), side slopes and substrate contaminated to groundwater, 64 ft below ground, 52.5 ft below base of unit.

Other Materials -
Concrete layer 0.2 ft thick, 2 ft below surface.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 461 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-5

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Crib Material	107	39			1.00	4,173	
Top Ash/Concrete (cln)	103	35	2.2	3,550		3,550	258
Void	94	26	4.4	2,420		2,420	351
Gravel	87	19	3.4	1,653		1,653	189
Bottom Ash	84	16	1.5	1,344			62
Subtotal	84	16	11.5	1,344		4,173	251
Contaminated Area							
Side Slopes	0	0	0.0	0		0	0
Below Base of Unit	0	0	0.0	0		0	0
Subtotal	0	0	0.0	0		0	0
TOTAL			4.9				251

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Crib Material	107	39			1.00	4,173	
Top Ash/Concrete (cln)	103	35	2.2	3,550		3,550	258
Void	94	26	4.4	2,420		2,420	351
Gravel	87	19	3.4	1,653		1,653	189
Bottom Ash	84	16	1.5	1,344			62
Subtotal	84	16	11.5	1,344		4,173	251
Contaminated Area							
Side Slopes	94	26	4.9	2,420		2,420	188
Below Base of Unit	94	26	5.0	2,420		2,420	448
Subtotal	94	26	5.0	2,420		2,420	637
TOTAL			9.9				887

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Crib Material	107	39			1.00	4,173	
Top Ash/Concrete (cln)	103	35	2.2	3,550		3,550	258
Void	94	26	4.4	2,420		2,420	351
Gravel	87	19	3.4	1,653		1,653	189
Bottom Ash	84	16	1.5	1,344			62
Subtotal	84	16	11.5	1,344		4,173	251
Contaminated Area							
Side Slopes	103	35	4.9	3,550		3,550	394
Below Base of Unit	103	35	52.5	3,550		3,550	6,903
Subtotal	103	35	52.5	3,550		3,550	7,296
TOTAL			57.4				7,547

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-5

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Crib Material							
Top Ash/Concrete (cln)							
Void							-351
Gravel							
Bottom Ash							
Subtotal	119	51	11.5	1,344	1.5	5,984	1,476
Contaminated Area							
Side Slopes							
Below Base of Unit							
Subtotal							
TOTAL			11.5				1,125

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Crib Material							
Top Ash/Concrete (cln)							
Void							-351
Gravel							
Bottom Ash							
Subtotal	143	75	11.5	4,439	1.5	10,790	3,159
Contaminated Area							
Side Slopes							
Below Base of Unit							
Subtotal	109	41	5.0	2,420	1.5	4,439	628
TOTAL			16.5				3,436

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Crib Material							
Top Ash/Concrete (cln)							
Void							-351
Gravel							
Bottom Ash							
Subtotal	295	227	11.5	49,965	1.5	66,756	24,773
Contaminated Area							
Side Slopes							
Below Base of Unit							
Subtotal	260	192	52.5	3,550	1.5	49,965	43,990
TOTAL			64.0				68,411

116B5.XLS 6/28/93

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-5

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	1,047 lcy	1500 lcy/shift	0.7	0.7
Other Clean Material	3,007 lcy	1500 lcy/shift	2.0	2.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	412 lcy	200 lcy/shift	2.1	2.1
Concrete Loading	412 lcy	1500 lcy/shift	0.3	0.3
TOTAL	4,054 lcy		5.0	5.0

NOTES:

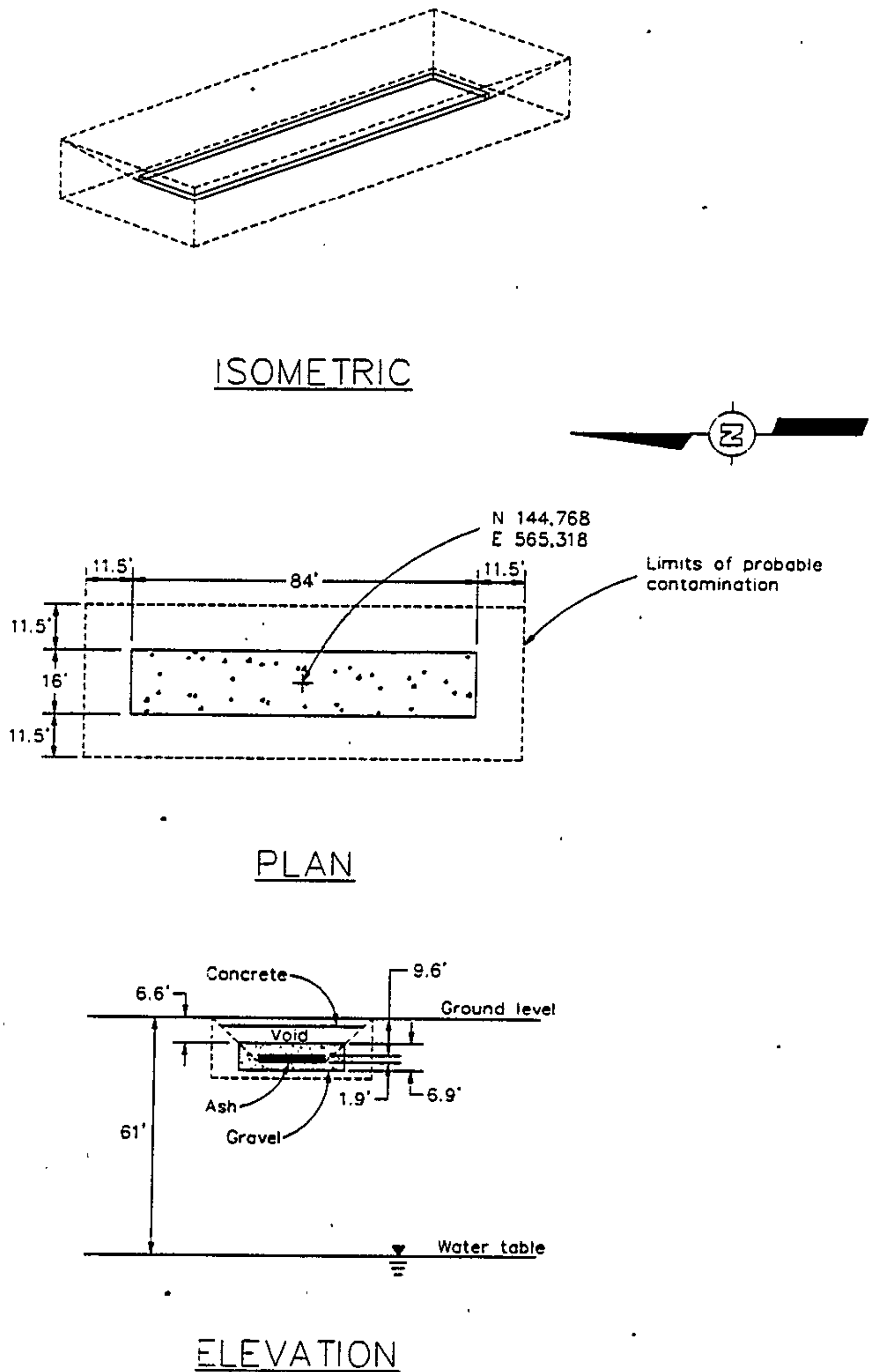
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 116-B-5

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-7
SITE NAME: 1904-B1 Outfall Structure

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
Length - 27 ft (Ref 1), assume base length of 27 ft.
Width - 14 ft (Ref 1), assume base width of 14 ft.
Depth - The structure was placed to a depth of 21 ft (Ref 3).
Slopes - The structure was built with vertical concrete walls.
It is assumed that the structure was not covered (backfilled). Assume top of structure at land surface.

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - Only structure.
Probable - Structure and 5 ft of substrate below its base is contaminated.
Maximum - Structure and substrate below its base to groundwater, 46 ft below land surface.

Other Materials -
Concrete structure.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 435 ft (Ref 7).
Groundwater - 389 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER 116-B-7

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Structure						
Concrete	27	14	21	378	378	77
Void Volume	27	14	21	378	378	-294
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Other Materials						0
TOTAL			21			77

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Structure						
Concrete	27	14	21	378	378	77
Void Volume	27	14	21	378	378	-294
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	27	14	5	378	378	70
Subtotal	27	14	5	378	378	70
Other Materials						0
TOTAL			26			147

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Structure						
Concrete	27	14	21	378	378	77
Void Volume	27	14	21	378	378	-294
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	27	14	25	378	378	350
Subtotal	27	14	25	378	378	350
Other Materials						0
TOTAL			46			427

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-7

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Structure							
Concrete & Soil	90	77	21.0	378	1.5	6,930	2,328
Void Volume							-294
Subtotal							2,034
Contaminated Area							
Lateral							
Below Base of Unit							
Subtotal							
Other Materials							0
TOTAL			21.0				2,034

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Structure							
Concrete & Soil	105	92	21.0	1,218	1.5	9,660	3,716
Void Volume							-294
Subtotal							3,422
Contaminated Area							
Lateral							
Below Base of Unit							
Subtotal	42	29	5.0	378	1.5	1,218	141
Other Materials							0
TOTAL			26.0				3,563

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Structure							
Concrete & Soil	165	152	21.0	9,078	1.5	25,080	12,769
Void Volume							-294
Subtotal							12,475
Contaminated Area							
Lateral							
Below Base of Unit							
Subtotal	102	89	25.0	378	1.5	9,078	3,510
Other Materials							0
TOTAL			46.0				15,985

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Volume Estimate
100 BC Area

SITE NUMBER: 116-B-7

**EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME**

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	206 lcy	1500 lcy/shift	0.1	0.1
Other Clean Material	4,030 lcy	1500 lcy/shift	2.7	2.7
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	123 lcy	200 lcy/shift	0.6	0.6
Concrete Loading	123 lcy	1500 lcy/shift	0.1	0.1
TOTAL	4,236 lcy		3.5	3.5

NOTES:

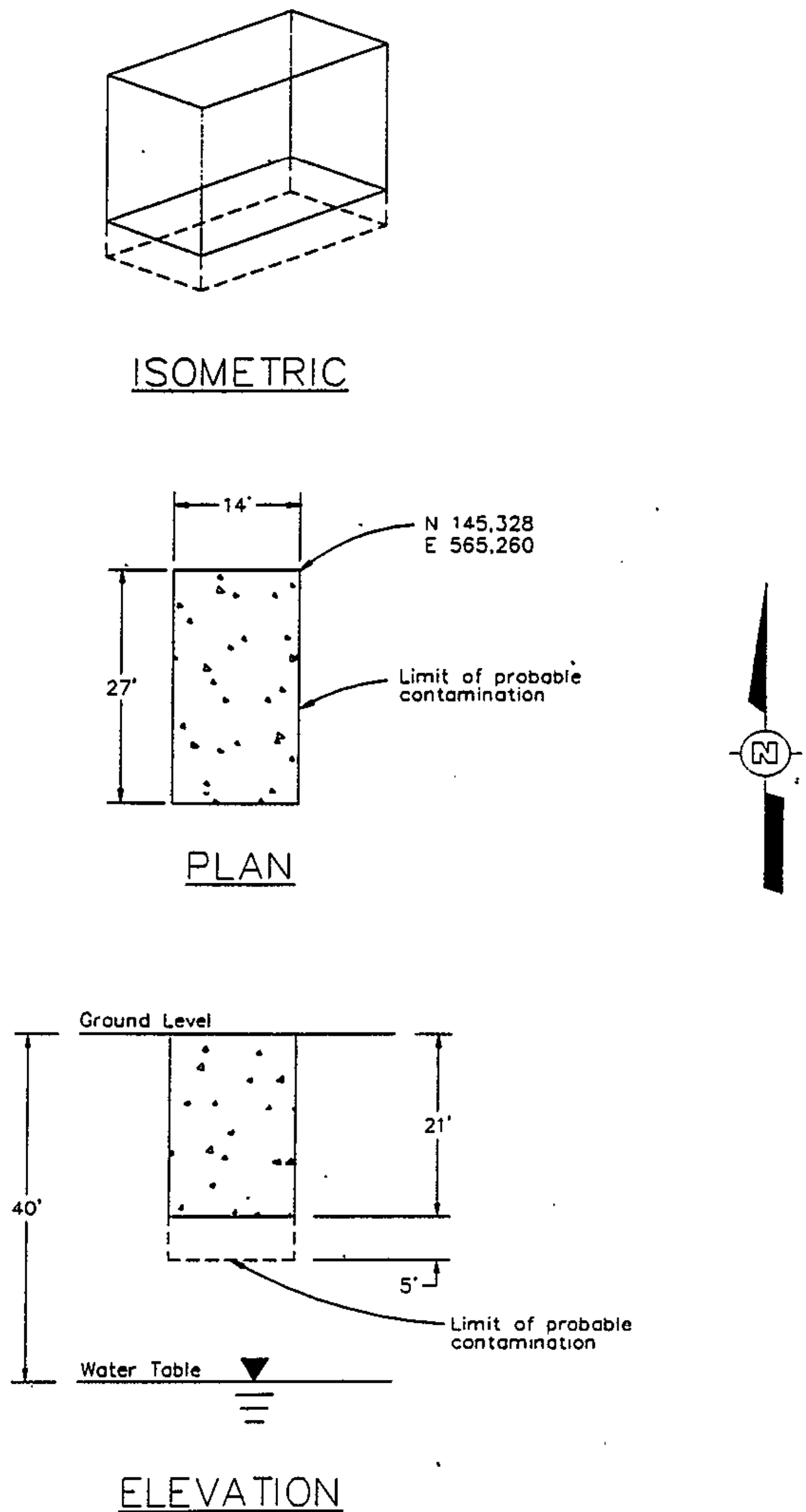
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 116-B-7

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-16
SITE NAME: 111-B Fuel Examination Tank

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
Length - 10.67 ft (Ref 1).
Width - 5.75 ft (Ref 1).
Depth - 9 ft (Ref 1).
Slopes - The crib was built with vertical concrete walls.
It is assumed that the unit was not backfilled.

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - Only structure.
Probable - Structure and 5 ft of substrate below its base.
Maximum - Structure and substrate below its base to groundwater, 82 ft (Ref 6).

Other Materials -
Concrete walls are assumed to be 8 in thick, the concrete floor is assumed to be 12 in thick.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 479 ft (Ref 7)
Groundwater -397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-16

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Void	10.7	5.8	9	61	61	-20
Contaminated Area						
Lateral	0.0	0.0	0	0	0	0
Below Base of Unit	0.0	0.0	0	0	0	0
Subtotal	0.0	0.0	0	0	0	0
Concrete						9
Other Materials						0
TOTAL			9			9

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Void	10.7	5.8	9	61	61	-20
Contaminated Area						
Lateral	0.0	0.0	0	0	0	0
Below Base of Unit	10.7	5.8	5	61	61	11
Subtotal	10.7	5.8	5	61	61	11
Concrete						9
Other Materials						0
TOTAL			14			20

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Void	10.7	5.8	9	61	61	-20
Contaminated Area						
Lateral	0.0	0.0	0	0	0	0
Below Base of Unit	10.7	5.8	73	61	61	166
Subtotal	10.7	5.8	73	61	61	166
Concrete						9
Other Materials						0
TOTAL			82			175

Volume Estimate
100 BC Area

SITE NUMBER: 116-B-16

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Crib Void							-20
Crib Layer	38	33	9	61	1.5	1,234	175
Contaminated Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							9
Other Materials							0
TOTAL			9				164

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Crib Void							-20
Crib Layer	53	48	9	533	1.5	2,515	467
Contaminated Area							
Lateral				0			
Below Base of Unit	26	21	5	61	1.5	533	48
Subtotal	26	21	5	61	1.5	533	48
Concrete							9
Other Materials							0
TOTAL			14				504

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Crib Void							-20
Crib Layer	257	252	9	51,618	1.5	64,617	19,332
Contaminated Area							
Lateral				0			
Below Base of Unit	230	225	73	61	1.5	51,618	48,251
Subtotal	230	225	73	61	1.5	51,618	48,251
Concrete							9
Other Materials							0
TOTAL			82				67,572

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Volume Estimate
100 BC Area

SITE NUMBER: 116-B-16

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	28 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	571 lcy	1500 lcy/shift	0.4	0.4
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	14 lcy	200 lcy/shift	0.1	0.1
Concrete Loading	14 lcy	1500 lcy/shift	0.0	0.0
TOTAL	599 lcy		0.5	1.0

NOTES:

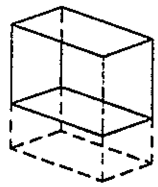
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



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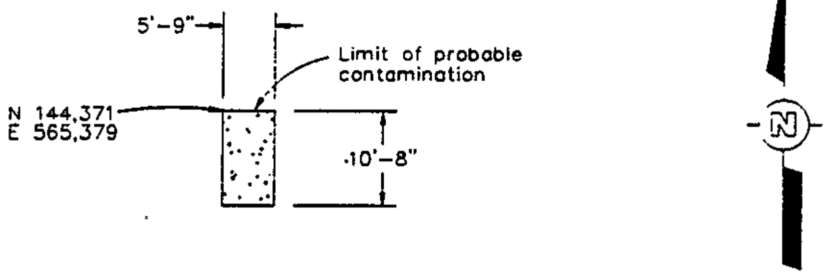
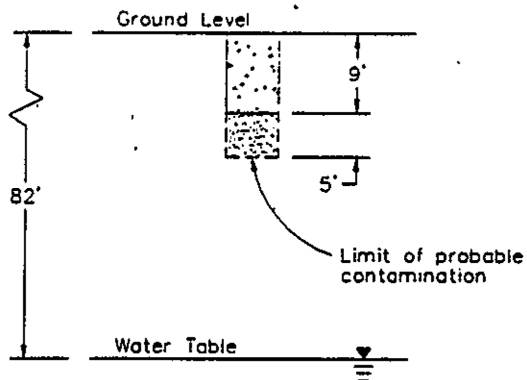


PLAN



ELEVATION

SCALE: NONE

WASTE SITE 116-B-16

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-2A
SITE NAME: 105-C Pluto Crib

CONTAMINATED DIMENSION ASSUMPTIONS:

Crib -
The crib was built in a basin 140 ft long and 100 ft wide (at the surface) trench. The crib was set in the western portion of the basin with its top 20 ft below grade.
Length - 22 ft 8 in (Ref 3).
Width - 15 ft 4 in (Ref 3).
Depth - Top of the crib is 20 ft below grade. The crib extends another 6 ft 9 in deep, 26 ft 9 in total (Ref 3).
Slopes - The crib was built with vertical walls.
The basin has been backfilled to grade (Ref 2, 7).

Contaminated Area -
North, South, East, West - No lateral contamination.
Depth -
Minimum - The crib only.
Probable - Contamination extends to 55 ft below grade, 28 ft below the base of the crib (Ref 2).
Maximum - Contamination extends to groundwater, 95 ft below grade.

Other Materials -
The crib was constructed with precast concrete blocks and is covered with a 6 in thick concrete slab. A 8 inch diameter steel cased monitoring well extends from the top of the crib structure to an elevation of 375 ft (20 ft below groundwater).

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 492 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-2A

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill						
Concrete						20
Other Materials	23	15	7	347	347	67
Subtotal	23	15	7	347	347	87
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
TOTAL			7			87

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill						
Concrete						20
Other Materials	23	15	7	347	347	67
Subtotal	23	15	7	347	347	87
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	23	15	28	347	347	360
Subtotal	23	15	28	347	347	360
TOTAL			35			446

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Crib Fill						
Concrete						20
Other Materials	23	15	7	347	347	67
Subtotal	23	15	7	347	347	87
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	23	15	68	347	347	874
Subtotal	23	15	68	347	347	874
TOTAL			75			960

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-2A

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	103	96	20	1,526	1.5	9,834	3,763
Crib Fill							
Concrete							
Other Materials							
Subtotal	43	36	7	347	1.5	1,526	217
Contaminted Area							
Lateral							
Below Base of Unit							
Subtotal							
TOTAL			27				3,980

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	187	179	20	15,114	1.5	33,474	17,551
Crib Fill							
Concrete							
Other Materials							
Subtotal	127	119	7	10,592	1.5	15,114	3,159
Contaminted Area							
Lateral							
Below Base of Unit	107	99	28	347	1.5	10,592	4,453
Subtotal							
TOTAL			55				25,162

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	307	299	20	59,033	1.5	91,792	55,417
Crib Fill							
Concrete							
Other Materials							
Subtotal	247	239	7	49,709	1.5	59,033	13,415
Contaminted Area							
Lateral							
Below Base of Unit	227	219	68	347	1.5	49,709	45,565
Subtotal							
TOTAL			95				114,396

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-2A

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	535 lcy	1500 lcy/shift	0.4	0.4
Other Clean Material	29,165 lcy	1500 lcy/shift	19.4	19.4
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	32 lcy	200 lcy/shift	0.2	0.2
Concrete Loading	32 lcy	1500 lcy/shift	0.0	0.0
TOTAL	29,700 lcy		20.0	20.0

NOTES:

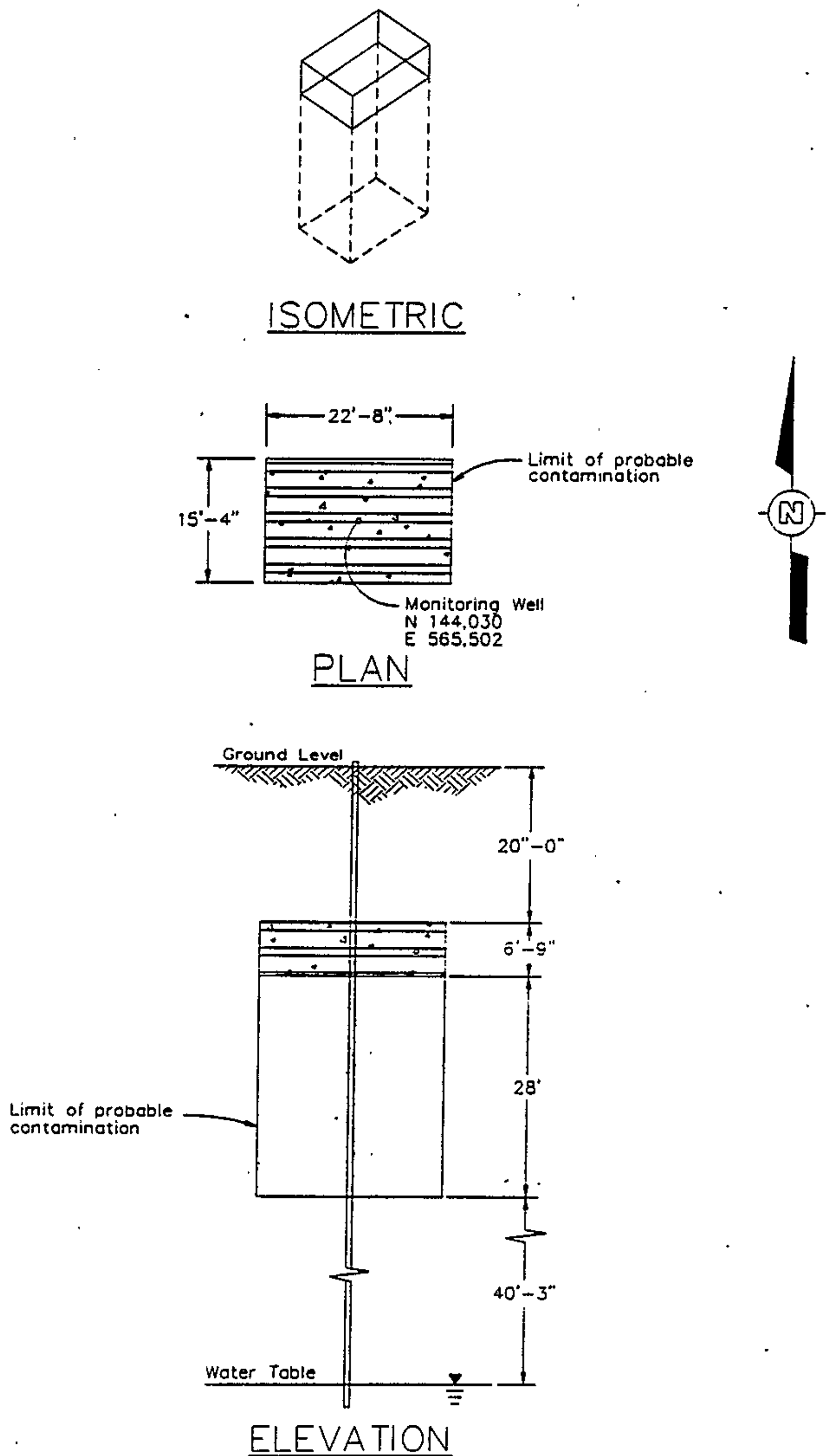
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 116-C-2A

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-2B
SITE NAME: 105-C Pluto Crib Pump Station

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
The pump station is a concrete structure containing two pumps, steel piping, valves, and other metal components. The sump was only capable of holding 6 ft of liquid.
Length - 9 ft 8 in (Ref 3).
Width - 6 ft 8 in (Ref 3).
Depth - Base of the structure is 29 ft 4 in below grade (Ref 3).
Slopes - The structure was built with vertical walls (Ref 3).

Contaminated Area -
North, South, East, West - No lateral contamination.
Depth -
Minimum - Only the lower 6 ft of concrete (Ref 3).
Probable - Lower 6 ft of concrete and 5 ft of substrate below the base of the station.
Maximum - Lower 6 ft of concrete and substrate to groundwater, 95 ft below grade, 66 ft below the base of the station.
Other Materials -
The volume of metals within the station is estimated to be 1 bcy.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 494 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-2B

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Pump Station						
Contaminated Concrete	10	7	6	64	64	7
Uncontam. Concrete	10	7	23			12
Metal						1
Subtotal	10	7	6	64	64	8
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
TOTAL			6			8

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Pump Station						
Contaminated Concrete	10	7	6	64	64	7
Uncontam. Concrete	10	7	23			12
Metal						1
Subtotal	10	7	6	64	64	8
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	10	7	5	64	64	12
Subtotal	10	7	5	64	64	12
TOTAL			11			20

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Pump Station						
Contaminated Concrete	10	7	6	64	64	7
Uncontam. Concrete	10	7	23			12
Metal						1
Subtotal	10	7	6	64	64	8
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	10	7	66	64	64	158
Subtotal	10	7	66	64	64	158
TOTAL			72			166

Volume Estimate.
100 BC Area

SITE NUMBER: 116-C-2B

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Pump Station							
Contaminated Concrete							7
Uncontam. Concrete							12
Metal							1
Subtotal	97	94	29	64	1.5	9.055	3.543
Contaminted Area							
Lateral							
Below Base of Unit	0	0	0	0	1.5	0	0
Subtotal	0	0	0	0	1.5	0	0
TOTAL			29				3.543

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Pump Station							
Contaminated Concrete							7
Uncontam. Concrete							12
Metal							1
Subtotal	112	109	29	535	1.5	12.135	5.449
Contaminted Area							
Lateral							
Below Base of Unit	25	22	5	64	1.5	535	49
Subtotal	25	22	5	64	1.5	535	49
TOTAL			34				5.498

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Pump Station							
Contaminated Concrete							7
Uncontam. Concrete							12
Metal							1
Subtotal	295	292	29	42.504	1.5	85.946	67.628
Contaminted Area							
Lateral							
Below Base of Unit	208	205	66	64	1.5	42,504	34,659
Subtotal	208	205	66	64	1.5	42.504	34.659
TOTAL			95				102.287

Volume Esumate
100 BC Area

SITE NUMBER: 116-C-2B

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	27 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	6,464 lcy	1500 lcy/shift	4.3	4.3
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	2 tons	100 ton/shift	0.0	0.0
Metals Loading	2 tons	900 ton/shift	0.0	0.0
Concrete Demolition	30 lcy	200 lcy/shift	0.2	0.2
Concrete Loading	30 lcy	1500 lcy/shift	0.0	0.0
TOTAL	6,490 lcy		4.5	4.5

NOTES:

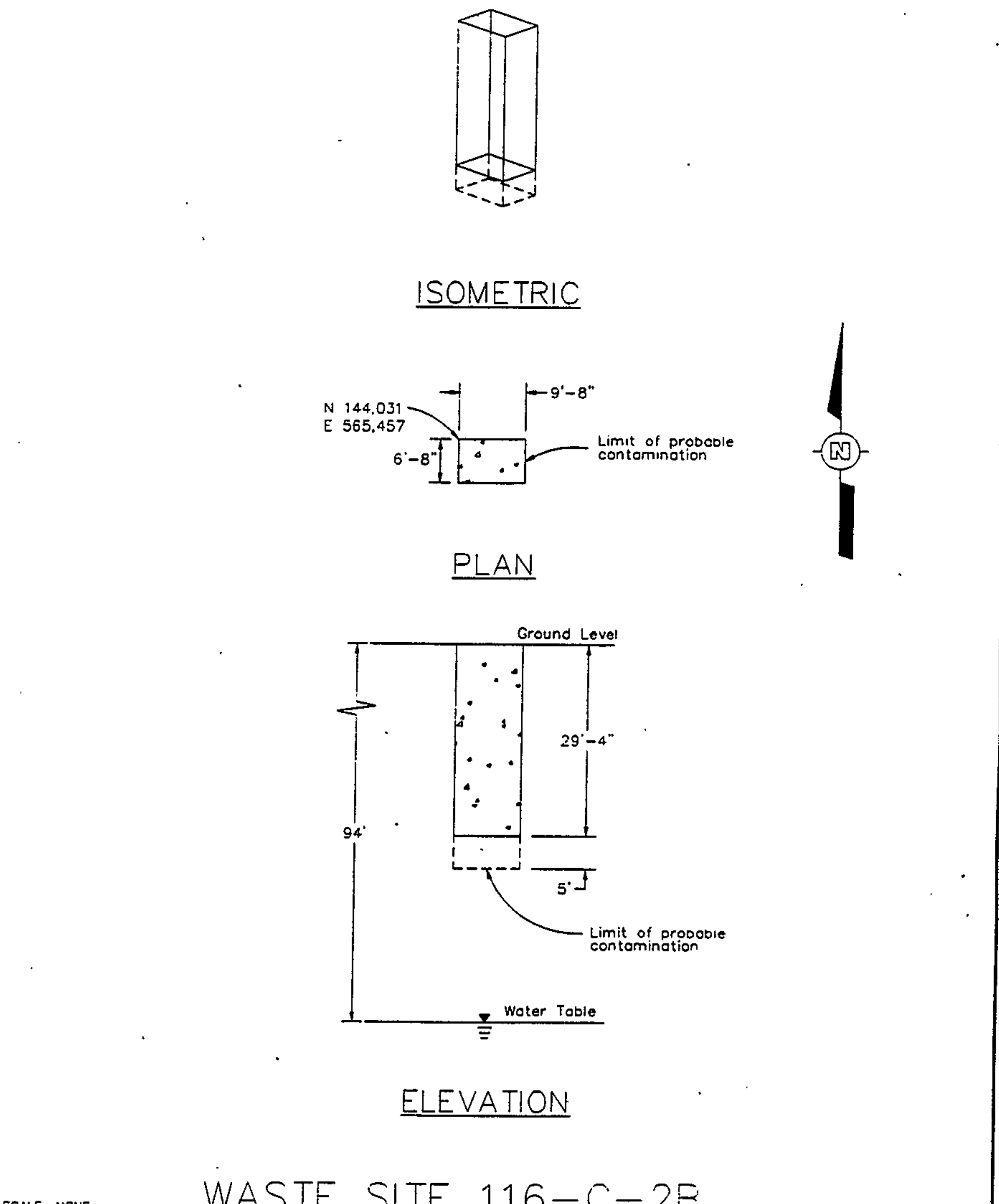
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 116-C-2B

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-2C
SITE NAME: 105-C Pluto Crib Sand Filter

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -

The sand filter is a concrete box filled with sand and gravel. The filter includes a liquid distribution system.
Length - 38 ft (Ref 3).
Width - 18 ft (Ref 3).
Depth - Base of the structure is 18 ft 3 in below grade (Ref 3).
Slopes - The structure was built with vertical walls (Ref 3).

Contaminated Area -

North, South, East, West - No lateral contamination.
Depth -
Minimum - The concrete, sand and gravel of the filter.
Probable - Minimum plus substrate to 5 ft below the base of the station.
Maximum - Minimum plus substrate to groundwater, 97 ft below grade, 79 ft below the base of the station.

Other Materials -

The volume of metals within the station is estimated to be negligible.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 494 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-2C

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Sand Filter						
Contaminated Concrete	38	18	18	684	684	120
Contaminated Fill	36	16	12			261
Metal						0
Subtotal	38	18	18	684	684	381
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
TOTAL			18			381

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Sand Filter						
Contaminated Concrete	38	18	18	684	684	120
Contaminated Fill	36	16	12			261
Metal						0
Subtotal	38	18	18	684	684	381
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	38	18	5	684	684	127
Subtotal	38	18	5	684	684	127
TOTAL			23			508

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Sand Filter						
Contaminated Concrete	38	18	18	684	684	120
Contaminated Fill	36	16	12			261
Metal						0
Subtotal	38	18	18	684	684	381
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	38	18	79	684	684	2,001
Subtotal	38	18	79	684	684	2,001
TOTAL			97			2,383

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-2C

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Sand Filter							
Contaminated Concrete							120
Contaminated Fill							261
Metal							0
Subtotal	93	73	18	684	1.5	6,748	2,174
Contaminated Area							
Lateral							
Below Base of Unit	0	0	0	0	1.5	0	0
Subtotal	0	0	0	0	1.5	0	0
TOTAL			18				2,174

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Sand Filter							
Contaminated Concrete							120
Contaminated Fill							261
Metal							0
Subtotal	108	88	18	1,749	1.5	9,455	3,449
Contaminated Area							
Lateral							
Below Base of Unit	53	33	5	684	1.5	1,749	218
Subtotal	53	33	5	684	1.5	1,749	218
TOTAL			23				3,667

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Sand Filter							
Contaminated Concrete							120
Contaminated Fill							261
Metal							0
Subtotal	330	310	18	70,125	1.5	102,140	57,882
Contaminated Area							
Lateral							
Below Base of Unit	275	255	79	684	1.5	70,125	68,727
Subtotal	275	255	79	684	1.5	70,125	68,727
TOTAL			97				126,609

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-2C

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	650 lcy	1500 lcy/shift	0.4	0.4
Other Clean Material	3,728 lcy	1500 lcy/shift	2.5	2.5
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	192 lcy	200 lcy/shift	1.0	1.0
Concrete Loading	192 lcy	1500 lcy/shift	0.1	0.1
TOTAL	4,378 lcy		4.0	4.0

NOTES:

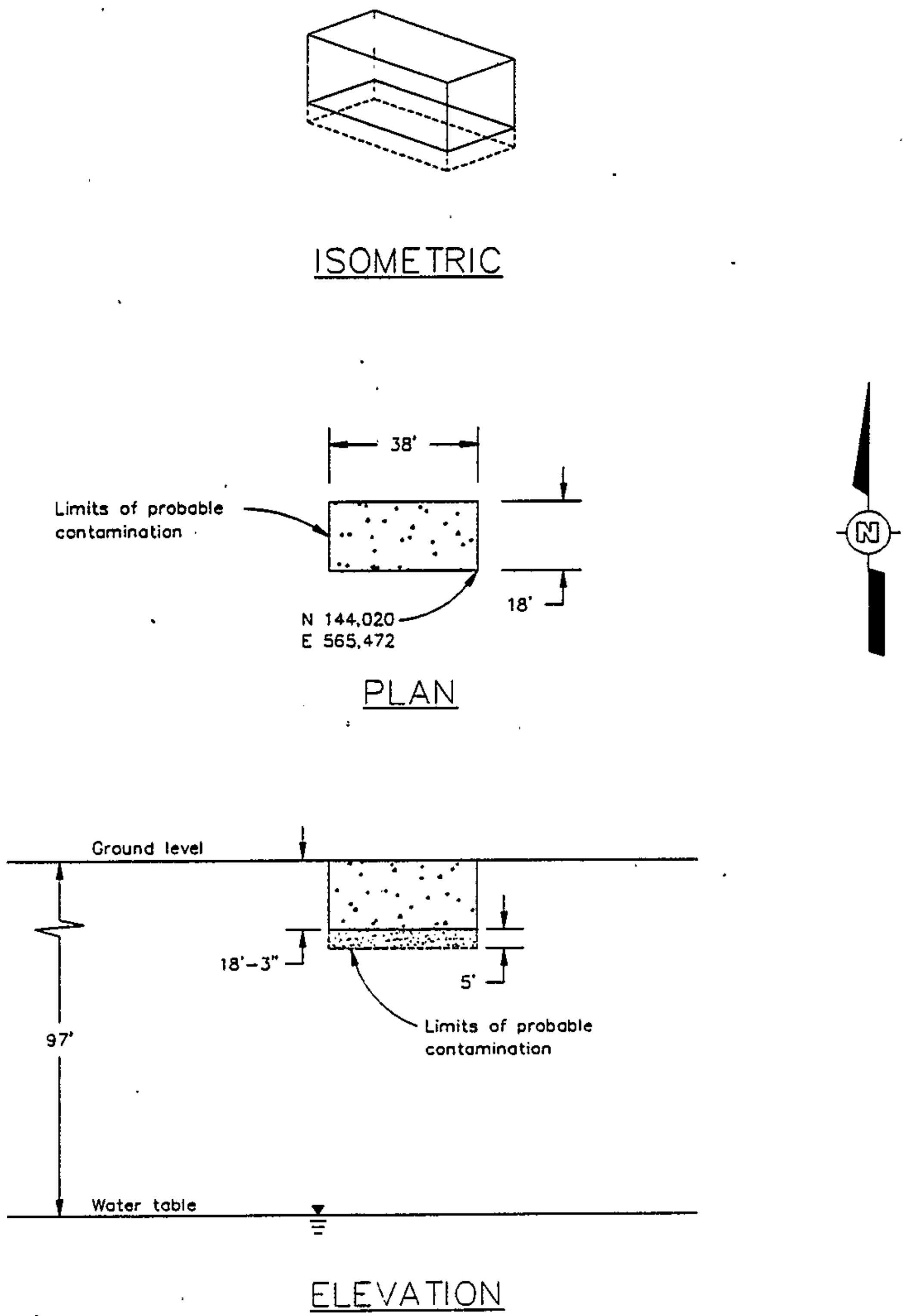
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 116-C-2C

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-3
SITE NAME: 105-C Chemical Storage Tanks

CONTAMINATED DIMENSION ASSUMPTIONS:

Tanks
Total Volume - 27,000 gal (Ref 1) (or 3610 cubic ft or 134 cy)
Assume two tanks each of:
Diameter - 10 ft
Length - 23 ft

Contaminated Area -
Assume no lateral or vertical leakage.
Minimum - none.
Probable - none.
Maximum - tanks only.

Other Materials -
Concrete cradles may be present, volume not calculated.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 494 ft (Ref 7).
Groundwater - 397 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The unit was never used (Ref 1).
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Assume that only in the maximum case would the tanks be removed.
Assume tanks are 6 ft underground and are made of 3/8 in metal.
Assume the tanks are ten feet apart.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-3

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Tank - Metal (each)	0	0	0	0	0	0
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete	0	0	0	0	0	0
Other Materials	0	0	0	0	0	0
TOTAL			0			0

PROBABLE

Unit	Length ft	Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Tank - Metal (each)	0	0	0	0	0	0
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete	0	0	0	0	0	0
Other Materials	0	0	0	0	0	0
TOTAL			0			0

MAXIMUM

Unit	Length ft	Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Tank - Metal (each)	23	10	10	230	230	67
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete	0	0	0	0	0	0
Other Materials	0	0	0	0	0	0
TOTAL			10			134

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-3

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Uncontaminated Cover	0	0	0	0	1.5	0	0
Tank - Metal (both)	0	0	0	0	1.5	0	0
Contaminated Area							
Lateral	0	0	0	0	1.5	0	0
Below Base of Unit	0	0	0	0	1.5	0	0
Subtotal	0	0	0	0	1.5	0	0
Concrete	0	0	0	0	0	0	0
Other Materials	0	0	0	0	0	0	0
TOTAL			0				0

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Uncontaminated Cover	0	0	0	0	1.5	0	0
Tank - Metal (both)	0	0	0	0	1.5	0	0
Contaminated Area							
Lateral	0	0	0	0	1.5	0	0
Below Base of Unit	0	0	0	0	1.5	0	0
Subtotal	0	0	0	0	1.5	0	0
Concrete	0	0	0	0	0	0	0
Other Materials	0	0	0	0	0	0	0
TOTAL			0				0

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Uncontaminated Cover	71	68	6	2,650	1.5	4,828	819
Tank - Metal (both)	53	50	10	460	1.5	2,650	473
Contaminated Area							
Lateral	0	0	0	0	1.5	0	0
Below Base of Unit	0	0	0	0	1.5	0	0
Subtotal	0	0	0	0	1.5	0	0
Concrete	0	0	0	0	0	0	0
Other Materials	0	0	0	0	0	0	0
TOTAL			16				1,292

Volume Estimate
100 BC Area

SITE NUMBER: 116-C-3

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	0 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	0 lcy	1500 lcy/shift	0.0	0.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	0 lcy		0.0	0.0

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-4
SITE NAME: Horizontal Control Rod Storage Cave

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
The site is a cave covered with a 4 ft thick mound of earth (Ref 1). The cave is a 1.17 x 3.75 x 54 ft steel and concrete box (WHC Dwg P-8877).

Contaminated Area -
Minimum - None
Probable - Assume contamination exists only in the concrete and steel.
Maximum - Same as Probable.

Other Materials -
Uncontaminated fill material mound covering cave.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 492 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-4

CONTAMINATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Subtotal Volume bcy	Volume bcy
Concrete					
Walls inside mound	6	5	1	3.0	0.7
Door section	6	3	1	0.8	0.4
Face of mound	10	7	1	5.0	2.5
Side face of mound	8	6.75	1	2.0	1.0
" below grade	8	2.5	1	3.0	1.5
Floor inside cave	54	5.67	0.33	3.8	3.8
Outside pad	11.5	10	0.33	2.8	1.4
Subtotal				20.4	
Steel					
Bands around cave	3	0.08	0.01	0.01	0.00
Door C's					
Plates	54	1	0.02	0.25	0.04
Subtotal				0.26	
Total - concrete					20
Total - steel					0.26

EXCAVATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Clean fill mound							
on top of cave	54	10	6				115
sides of cave							
dimension 1	54	7	7				40
dimension 2 (-)	4	7	7				
Subtotal							155
Below grade					1.5		275
top dimension	86	35	3			2,989	
bottom dimension	77	26	3	1,983			
Subtotal	77	26	3	1,983		2,989	
TOTAL							430

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-4

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
0	0	1.5	10	40	0	0	0	0

Sub-Volume I	0
Sub-Volume II	0
Sub-Volume III	0
Sub-Volume IV	0

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-4

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	33 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	507 lcy	1500 lcy/shift	0.3	0.3
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	2 tons	100 ton/shift	0.0	0.0
Metals Loading	2 tons	900 ton/shift	0.0	0.0
Concrete Demolition	33 lcy	200 lcy/shift	0.2	0.2
Concrete Loading	33 lcy	1500 lcy/shift	0.0	0.0
TOTAL	540 lcy		0.6	1.0

NOTES:

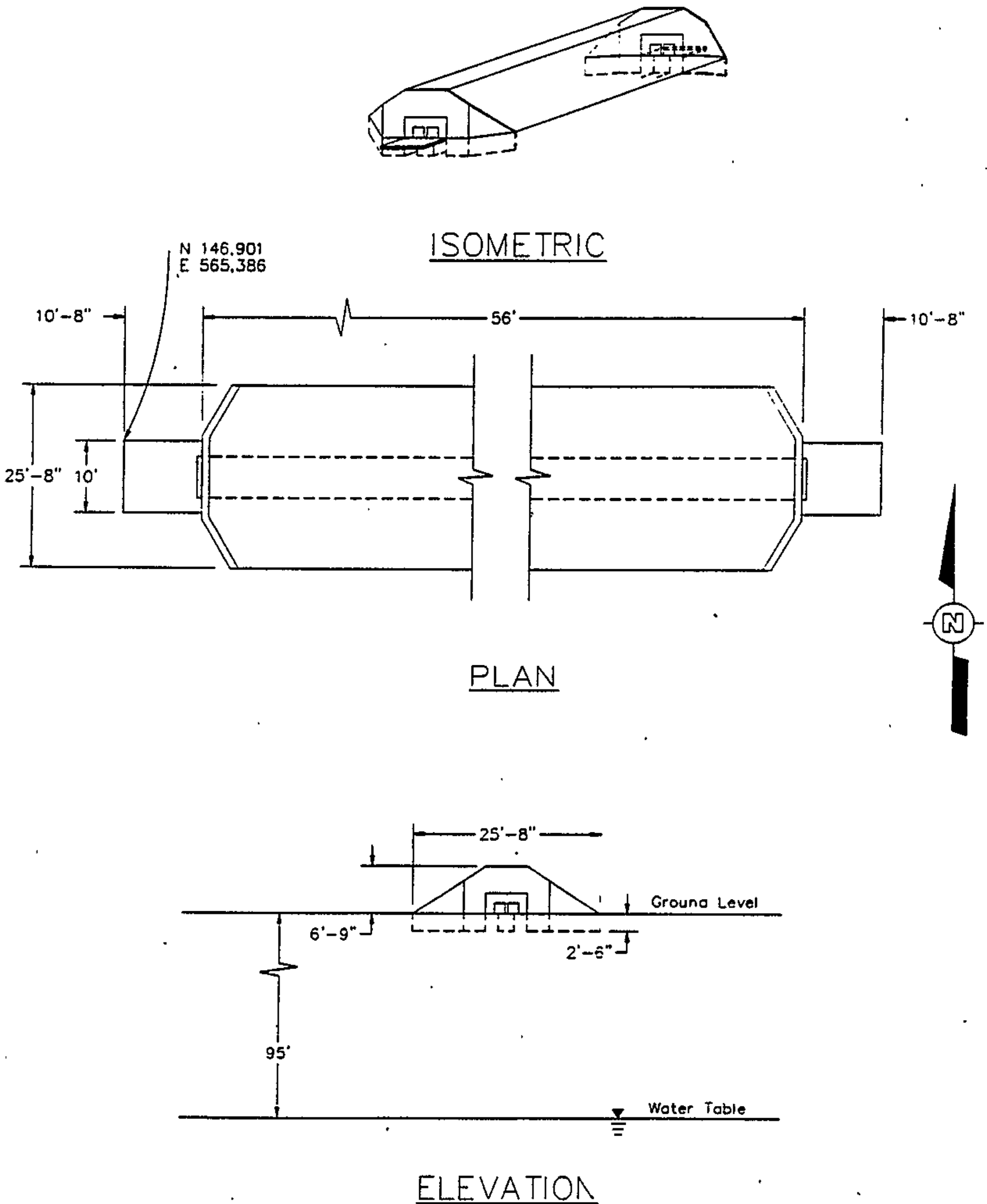
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 118-C-1

Volume Estimate
100 BC Area

SITE NUMBER: 120-B-1
SITE NAME: 105-B Battery Acid Sump

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
The location and configuration of the sump are unknown. It is assumed that the structure is concrete with 8 in walls and a 12 in floor slab.
Length - 10 ft inside dimension.
Width - 10 ft inside dimension.
Depth - Base of the structure is 11 ft below grade.
Slopes - The structure was built with vertical walls.
It is assumed that the sump was not backfilled.

Contaminated Area -
North, South, East, West - No lateral contamination.
Depth -
Minimum - The concrete only.
Probable - Contamination extends to 5 ft below the base of the sump.
Maximum - Contamination extends to groundwater, 72 ft below grade, 61 ft below the base of the sump.

Other Materials -
The volume of metals within the station is estimated to be negligible.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 469 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 120-B-1

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Sump						
Contaminated Concrete	11	11	11	114	114	15
Contaminated Fill						0
Metal						0
Subtotal	11	11	11	114	114	15
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
TOTAL			11			15

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Sump						
Contaminated Concrete	11	11	11	114	114	15
Contaminated Fill						0
Metal						0
Subtotal	11	11	11	114	114	15
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	11	11	5	114	114	21
Subtotal	11	11	5	114	114	21
TOTAL			16			36

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Sump						
Contaminated Concrete	11	11	11	114	114	15
Contaminated Fill						0
Metal						0
Subtotal	11	11	11	114	114	15
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	11	11	61	114	114	257
Subtotal	11	11	61	114	114	257
TOTAL			72			272

Volume Estimate
100 BC Area

SITE NUMBER: 120-B-1

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Sump							
Contaminated Concrete							15
Contaminated Fill							0
Metal							0
Subtotal	44	44	11	114	1.5	1,907	338
Contaminated Area							
Lateral							
Below Base of Unit	0	0	0	0	1.5	0	0
Subtotal	0	0	0	0	1.5	0	0
TOTAL			11				338

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Sump							
Contaminated Concrete							15
Contaminated Fill							0
Metal							0
Subtotal	59	59	11	659	1.5	3,442	761
Contaminated Area							
Lateral							
Below Base of Unit	26	26	5	114	1.5	659	65
Subtotal	26	26	5	114	1.5	659	65
TOTAL			16				826

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Sump							
Contaminated Concrete							15
Contaminated Fill							0
Metal							0
Subtotal	227	227	11	37,508	1.5	51,379	18,033
Contaminated Area							
Lateral							
Below Base of Unit	194	194	61	114	1.5	37,508	28,290
Subtotal	194	194	61	114	1.5	37,508	28,290
TOTAL			72				46,322

Volume Estimate
100 BC Area

SITE NUMBER: 120-B-1

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	49 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	932 lcy	1500 lcy/shift	0.6	0.6
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	24 lcy	200 lcy/shift	0.1	0.1
Concrete Loading	24 lcy	1500 lcy/shift	0.0	0.0
TOTAL	981 lcy		0.8	1.0

NOTES:

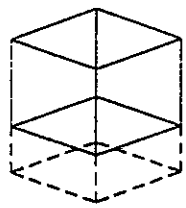
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

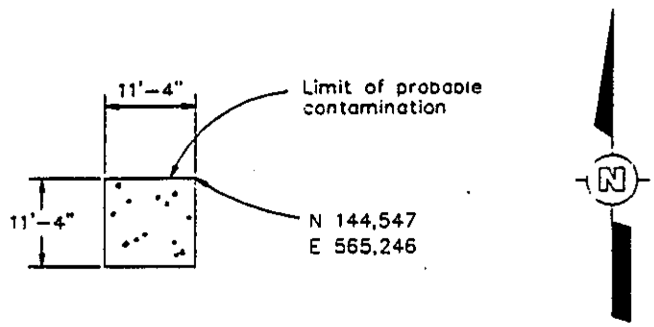
- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

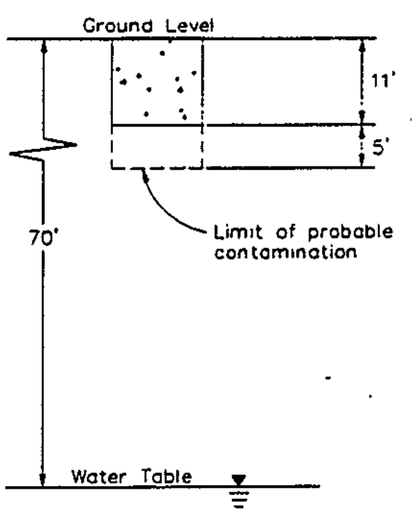
(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



ISOMETRIC



PLAN



ELEVATION

SCALE. NONE

.VASTE SITE 120-B-1

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-2
SITE NAME: 183-B Clear Wells

CONTAMINATED DIMENSION ASSUMPTIONS:

Clear Wells -
Length - 750 ft, both wells and pump room (Ref 7).
Width - 135 ft (Ref 7).
Depth - Pump room is 22 ft deep, well depth unknown.
Slopes - Vertical
Wells have a total capacity of 1 x 10E6 gallons. this volume has not been backfilled.

Contaminated Area -
Lateral - No lateral contamination.
Depth -
Minimum/Probable - No contamination (Ref 1).
Maximum - The pump room is contaminated.

Other Materials -
The wells and pump room are constructed of reinforced concrete.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 467 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-2

CONTAMINATED VOLUME

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Pump Station + Wells						
Contaminated Concrete	750	135	22	101,250	101,250	77,549
Uncontam. Concrete	750	135	0			0
Metal						0
Subtotal	750	135	22	101,250	101,250	77,549
TOTAL			22			77,549

EXCAVATED VOLUME

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Pump Station + Wells	816	201	22	101,250	1.5	164,016	102,528
Void Space (10E6 gal)							-4,951
TOTAL			22			164,016	97,577

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-2

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	0 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	0 lcy	1500 lcy/shift	0.0	0.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	0 lcy		0.0	0.0

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-4
SITE NAME: Brine and Salt Dilution Pits

CONTAMINATED DIMENSION ASSUMPTIONS:

Pits
Brine Pit - Volume is 500 cubic ft (10 x 10 x 5) (Ref 1).
Salt Dilution Pits - Volume is 900 cubic ft (10 x 10 x 9) (Ref 1).

Contaminated Area -
Assume no lateral or vertical leakage.
Minimum - none.
Probable - none.
Maximum - none.

Other Materials -
Structures are below grade, supporting structures are assumed to not exist.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 448 ft (Ref 7).
Groundwater - 397 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The unit was cleaned and demolished to 3 ft below grade. No contamination present (Ref 1).

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-1
SITE NAME: 108-B Tritium Separation Facility

CONTAMINATED DIMENSION ASSUMPTIONS:

Facility Foundation -
Length - 148 ft (Ref 1).
Width - 32 ft (Ref 1).
Depth - 12 ft (Ref 1).
Slopes - The foundation consists of vertical concrete.
The site was covered with 3 ft of fill after demolition (Ref 1). Assume top of remaining foundation is 3 ft below land surface.

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - None
Probable - None.
Maximum - Existing foundation and associated material.

Other Materials -
Concrete foundation.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 464 ft (Ref 7).
Groundwater - 397 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-1

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Facility Foundation	148	32	0	4,736	4,736	0
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			0			0

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Facility Foundation	148	32	0	4,736	4,736	0
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			0			0

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Facility Foundation	148	32	0	4,736	4,736	0
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	148	32	12	4,736	4,736	2,105
Subtotal	148	32	12	4,736	4,736	2,105
Concrete						0
Other Materials						0
TOTAL			12			2,105

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-1

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	148	32	0	4,736	1.5	4,736	0
Facility Foundation	148	32	0	4,736	1.5	4,736	0
Contaminated Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			0				0

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	148	32	0	4,736	1.5	4,736	0
Facility Foundation	148	32	0	4,736	1.5	4,736	0
Contaminated Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			0				0

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	184	68	3	10,325	1.5	12,512	2,038
Facility Foundation	175	59	9	4,736	1.5	10,325	2,470
Contaminated Area							
Lateral				0			
Below Base of Unit				0			
Subtotal	0	0	0	0	0	0	0
Concrete							247
Other Materials							0
TOTAL			12				4,508

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-1

**EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME**

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	0 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	0 lcy	1500 lcy/shift	0.0	0.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	0 lcy		0.0	0.0

NOTES:

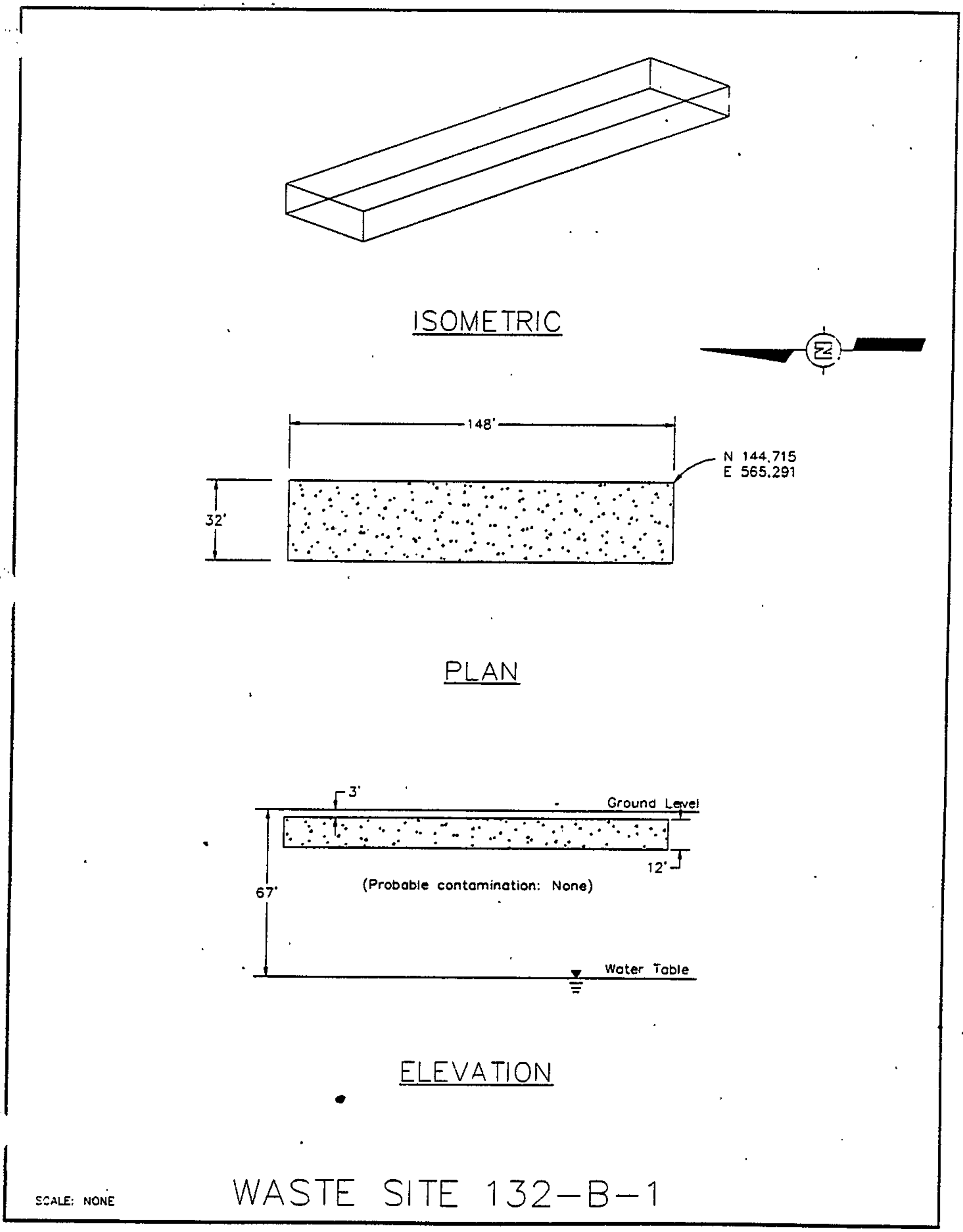
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.


ISOMETRIC
148'
N 144,715
E 565,291
32'
PLAN
3'
Ground Level
12'
67'
(Probable contamination: None)
Water Table
ELEVATION
SCALE: NONE
WASTE SITE 132-B-1

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-3
SITE NAME: 108-B Stack

CONTAMINATED DIMENSION ASSUMPTIONS:

Disposal Trench -
Length - 300 ft along bottom (Ref 1).
Width - 30 ft along bottom (Ref 1).
Depth - 18 ft below grade (Ref 1).
Slopes - 1.0H:1.0V
Disposal trench was filled once stack fell.

Contaminated Area -
North, South, East, West - no lateral contamination.
Minimum - none.
Probable = Maximum - Stack and trench materials only.

Other Materials -
Stack materials consist of concrete and metal. Metal volume is considered insignificant (volume = 0).
A concrete base was associated with this unit and is still in its original location. Volume not considered.

ELEVATIONS:

Surface - 459 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit, prior to demolition, was a hollow right circular cone.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-3

CONTAMINATED VOLUME

PROBABLE, MAXIMUM

Unit	Height ft	Radius 1 ft	Radius 2 ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Stack Concrete							
Outer Cone	300	9	3				1,277
Inner Cone	300	7	2				631
TOTAL-concrete							646

EXCAVATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Trench Material					1.5		12,588
Top dimension	354	84	18			29,736	
Bottom dimension	300	30	18	9,000			
TOTAL			18				12,588

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-3

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
18	0	1.5	10	26	0	0	0	0

Sub-Volume I	0
Sub-Volume II	0
Sub-Volume III	0
Sub-Volume IV	0

NOTES:

See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-3

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	1,033 lcy	1500 lcy/shift	0.7	0.7
Other Clean Material	14,092 lcy	1500 lcy/shift	9.4	9.4
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	1,033 lcy	200 lcy/shift	5.2	5.2
Concrete Loading	1,033 lcy	1500 lcy/shift	0.7	0.7
TOTAL	15,125 lcy		15.9	15.9

NOTES:

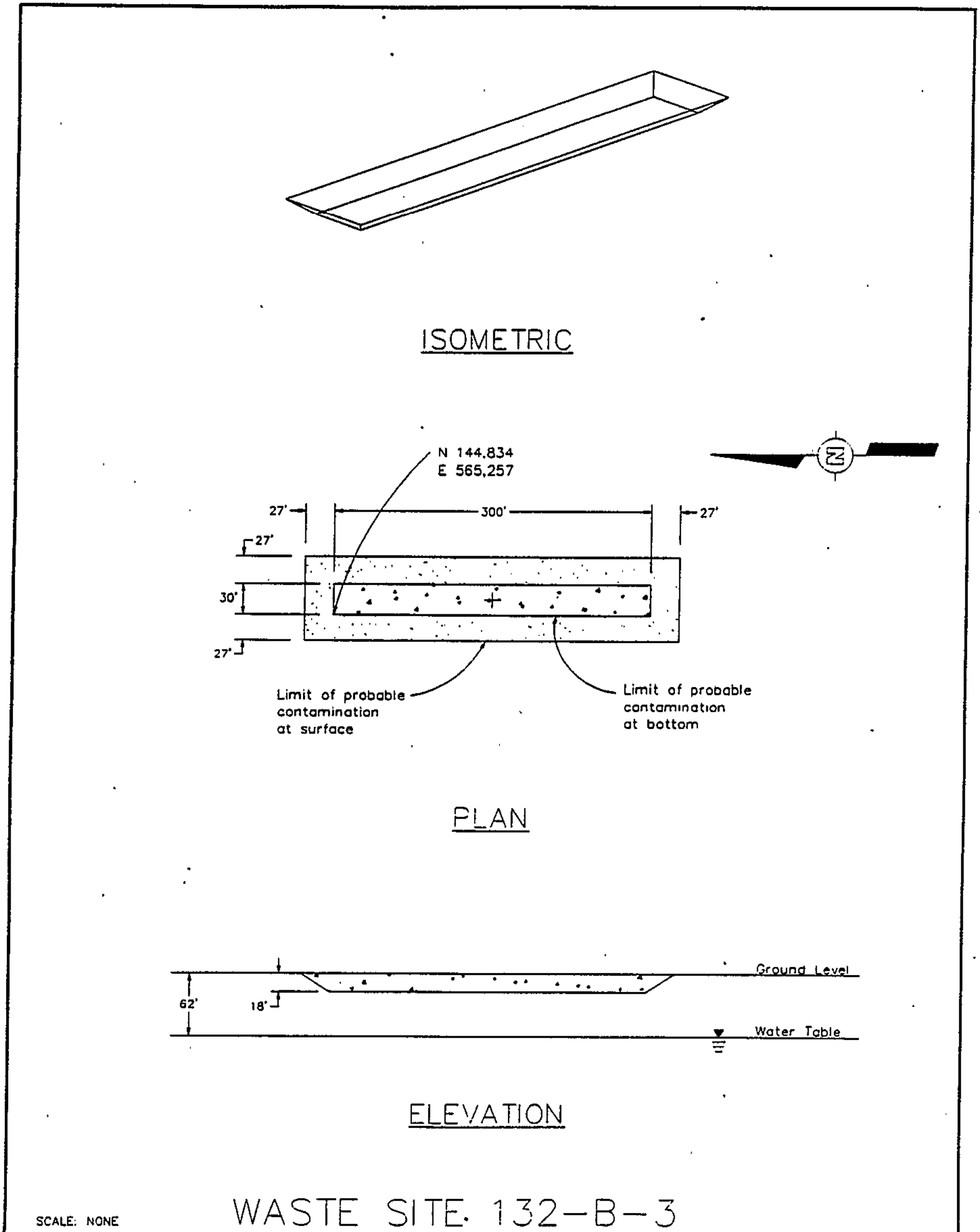
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 132-B-3

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-4
SITE NAME: 117-B Filter Building

CONTAMINATED DIMENSION ASSUMPTIONS:

Original Structure -
Length - 59 ft (Ref 1).
Width - 39 ft (Ref 1).
Depth - 35 ft (Ref 1), 27 ft below grade.
Slopes - The structure consists of vertical concrete.
The site was covered with 3 ft of fill after demolition (Ref 1). Assume top of remaining foundation is 3 ft below land surface.

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - None
Probable - None.
Maximum - Existing structure and associated demolished material.

Other Materials -
Concrete debris.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 472 ft (Ref 7).
Groundwater - 397 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-4

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Facility Foundation	59	39	0	2,301	2,301	0
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			0			0

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Facility Foundation	59	39	0	2,301	2,301	0
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			0			0

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Facility Foundation	59	39	0	2,301	2,301	0
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	59	39	24	2,301	2,301	2,045
Subtotal	59	39	24	2,301	2,301	2,045
Concrete						0
Other Materials						0
TOTAL			24			2,045

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-4

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	59	39	0	2,301	1.5	2,301	0
Facility Foundation	59	39	0	2,301	1.5	2,301	0
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			0				0

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	59	39	0	2,301	1.5	2,301	0
Facility Foundation	59	39	0	2,301	1.5	2,301	0
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			0				0

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	140	120	3	14,541	1.5	16,800	1,740
Facility Foundation	131	111	24	2,301	1.5	14,541	6,717
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			27				8,457

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-4

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	0 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	0 lcy	1500 lcy/shift	0.0	0.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	0 lcy		0.0	0.0

NOTES:

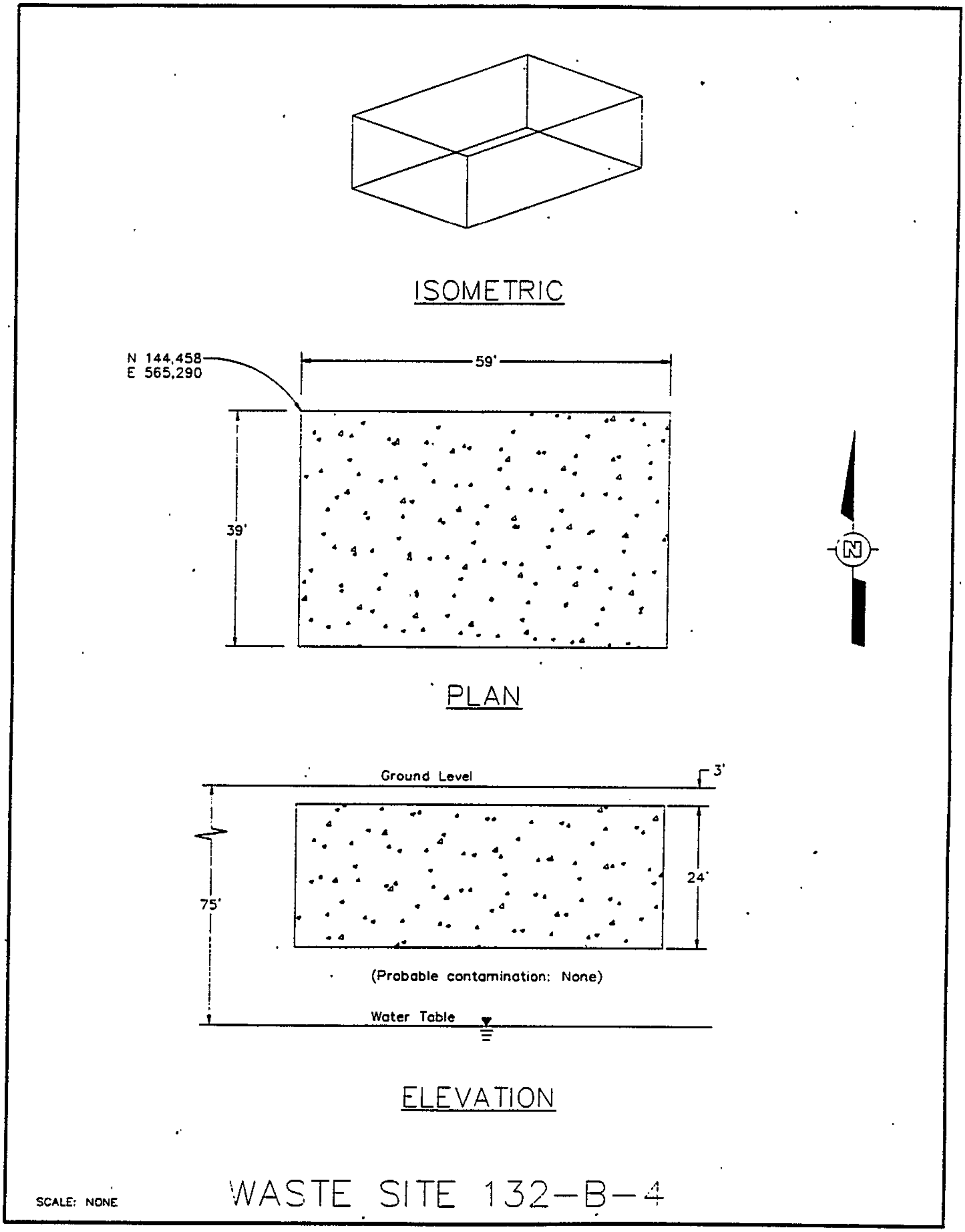
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.


ISOMETRIC
N 144,458
E 565,290
59'
39'
PLAN
Ground Level
3'
75'
24'
(Probable contamination: None)
Water Table
ELEVATION
SCALE: NONE
WASTE SITE 132-B-4

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-5
SITE NAME: 115 B/C Gas Recirculation Building

CONTAMINATED DIMENSION ASSUMPTIONS:

Original Structure -
Length - 168 ft (Ref 1).
Width - 72 ft to 98 ft, average 85 ft (Ref 1).
Depth - 11 ft (Ref 1), 11 ft below grade.
Slopes - Vertical
The site was covered with 3 ft of fill after demolition (Ref 1). Assume top of remaining materials is 3 ft below land surface.

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - None
Probable - None.
Maximum - Existing structure and associated demolished material.

Other Materials -
Concrete debris.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 472 ft (Ref 7).
Groundwater - 397 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-5

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Facility Foundation	168	85	0	14,280	14,280	0
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			0			0

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Facility Foundation	168	85	0	14,280	14,280	0
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Concrete						0
Other Materials						0
TOTAL			0			0

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Facility Foundation	168	85	0	14,280	14,280	0
Contaminted Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	168	85	8	14,280	14,280	0
Subtotal	168	85	8	14,280	14,280	4,231
Concrete						0
Other Materials						0
TOTAL			8			4,231

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-5

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	168	85	0	14,280	1.5	14,280	0
Facility Foundation	168	85	0	14,280	1.5	14,280	0
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			0				0

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	168	85	0	14,280	1.5	14,280	0
Facility Foundation	168	85	0	14,280	1.5	14,280	0
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			0				0

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Uncontaminated Cover	201	118	3	20,928	1.5	23,718	2,479
Facility Foundation	192	109	8	14,280	1.5	20,928	5,188
Contaminted Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Concrete							0
Other Materials							0
TOTAL			11				7,666

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-5

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	0 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	0 lcy	1500 lcy/shift	0.0	0.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	0 lcy		0.0	0.0

NOTES:

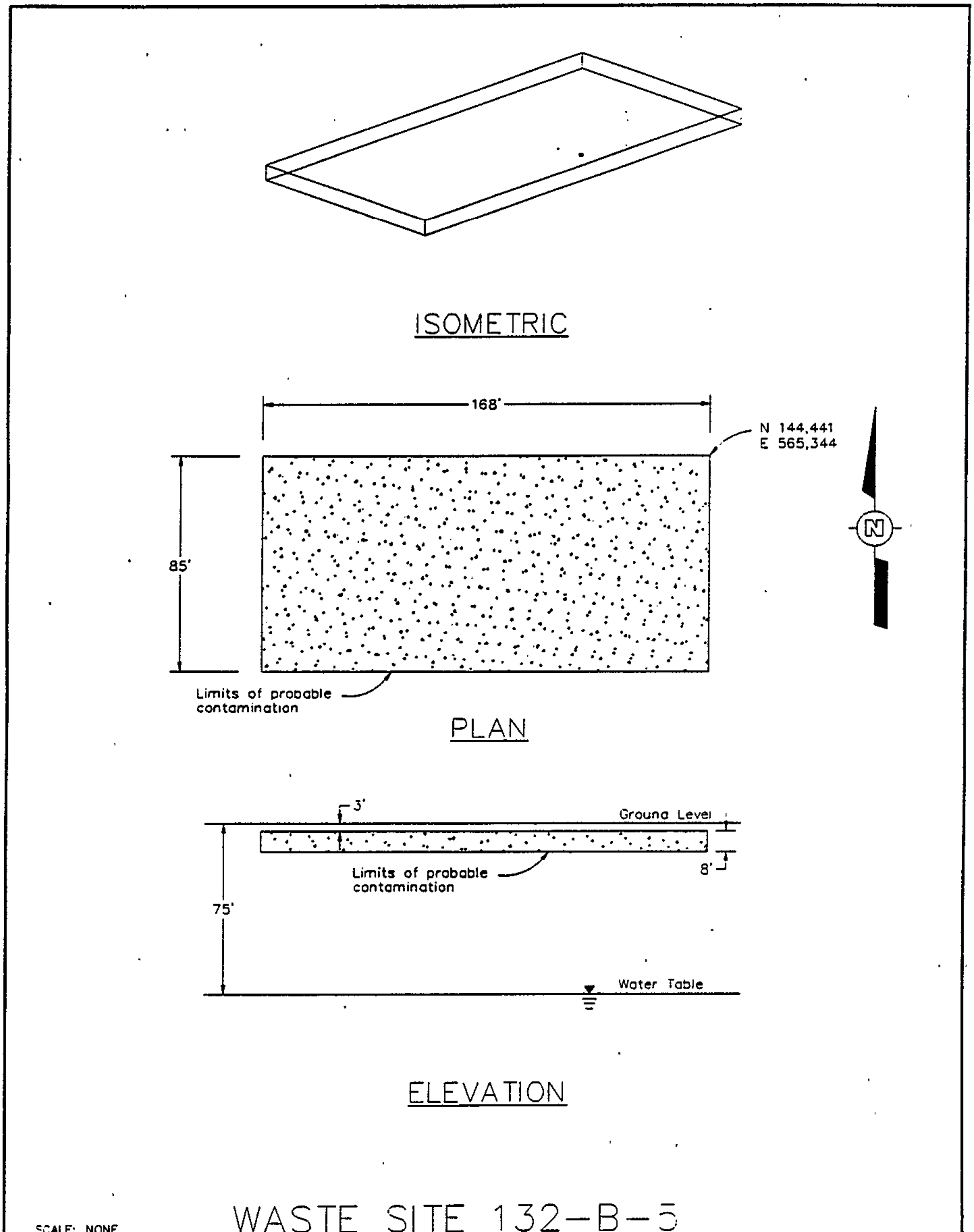
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 132-B-5

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-6
SITE NAME: 1904-B2 Outfall Structure

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
Length - 27 ft (Ref 1), assume base length of 27 ft.
Width - 14 ft (Ref 1), assume base width of 14 ft.
Depth - The structure was placed to a depth of 21 ft (Ref 3).
Slopes - The structure was built with vertical concrete walls.
The structure reduced to grade (Ref 1) and was not covered (backfilled). Assume top of remaining structure at land surface.

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - Only structure.
Probable - Structure and 5 ft of substrate below its base is contaminated.
Maximum - Structure and substrate below its base to groundwater, 46 ft below land surface.

Other Materials -
Concrete structure.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 435 ft (Ref 7).
Groundwater - 389 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER 132-B-6

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Structure						
Concrete	27	14	21	378	378	77
Void Volume	27	14	21	378	378	-294
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Other Materials						0
TOTAL			21			77

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Structure						
Concrete	27	14	21	378	378	77
Void Volume	27	14	21	378	378	-294
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	27	14	5	378	378	70
Subtotal	27	14	5	378	378	70
Other Materials						0
TOTAL			26			147

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Structure						
Concrete	27	14	21	378	378	77
Void Volume	27	14	21	378	378	-294
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	27	14	25	378	378	350
Subtotal	27	14	25	378	378	350
Other Materials						0
TOTAL			46			427

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-6

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Structure							
Concrete & Soil	90	77	21.0	378	1.5	6,930	2,328
Void Volume							-294
Subtotal							2,034
Contaminated Area							
Lateral							
Below Base of Unit							
Subtotal							
Other Materials							0
TOTAL			21.0				2,034

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Structure							
Concrete & Soil	105	92	21.0	1,218	1.5	9,660	3,716
Void Volume							-294
Subtotal							3,422
Contaminated Area							
Lateral							
Below Base of Unit							
Subtotal	42	29	5.0	378	1.5	1,218	141
Other Materials							0
TOTAL			26.0				3,563

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Structure							
Concrete & Soil	165	152	21.0	9,078	1.5	25,080	12,769
Void Volume							-294
Subtotal							12,475
Contaminated Area							
Lateral							
Below Base of Unit							
Subtotal	102	89	25.0	378	1.5	9,078	3,510
Other Materials							0
TOTAL			46.0				15,985

132B6.XLS 6/29/93

Volume Estimate
100 BC Area

SITE NUMBER: 132-B-6

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	206 lcy	1500 lcy/shift	0.1	0.1
Other Clean Material	4,030 lcy	1500 lcy/shift	2.7	2.7
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	123 lcy	200 lcy/shift	0.6	0.6
Concrete Loading	123 lcy	1500 lcy/shift	0.1	0.1
TOTAL	4,236 lcy		3.5	3.5

NOTES:

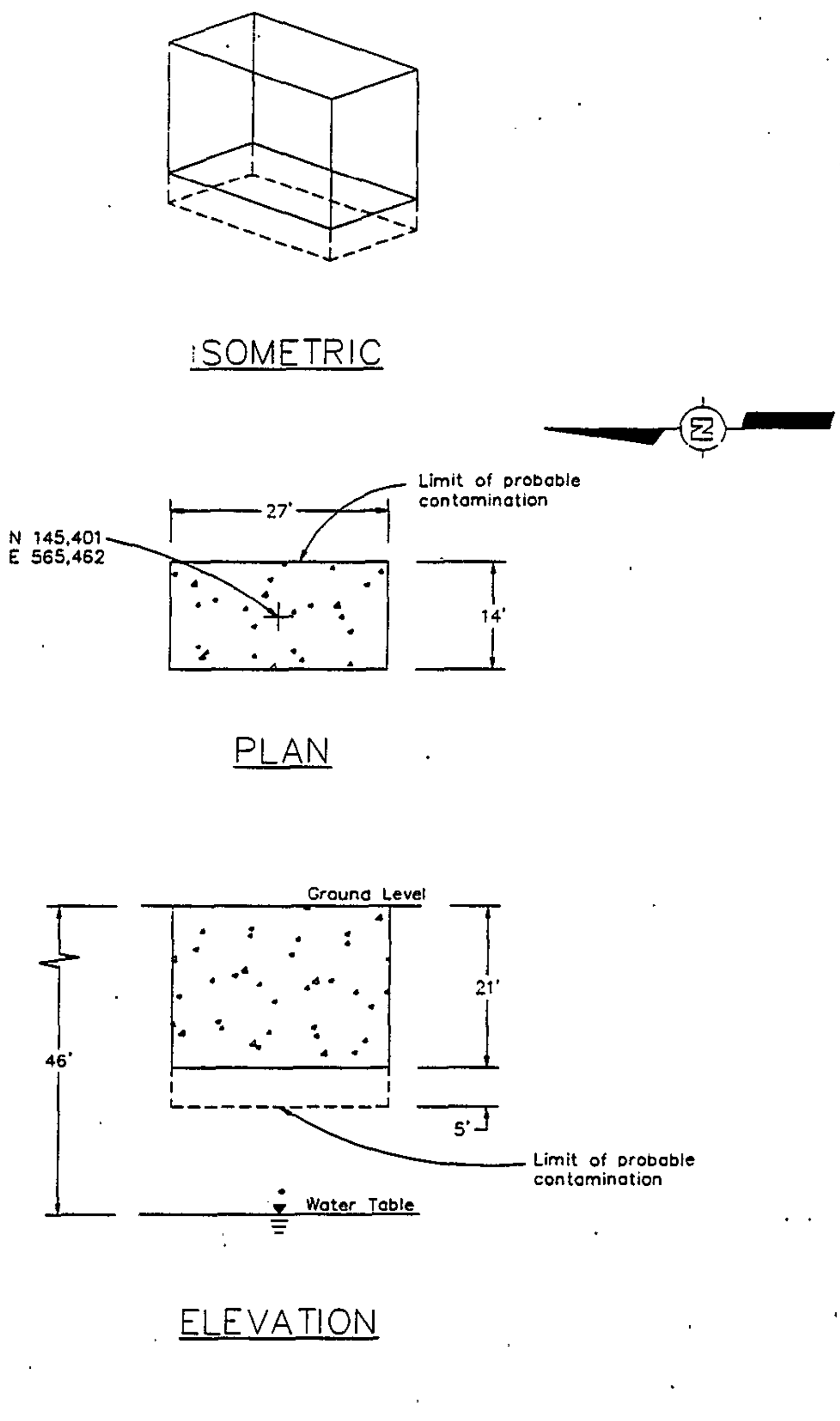
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 132-B-6

Volume Estimate
100 BC Area

SITE NUMBER: 132-C-1
SITE NAME: C Reactor Stack

CONTAMINATED DIMENSION ASSUMPTIONS:

Disposal Trench -
- Length - 200 ft at bottom (Ref 1).
- Width - assume 25 ft at bottom.
- Depth - assume 16 ft below grade.
- Assume Slope - 1.0H:1.0V
- Disposal trench was filled once stack fell.

Contaminated Area -
- North, South, East, West - no lateral contamination.
- Minimum - none.
- Probable = Maximum - Stack materials only.

Other Materials -
- Stack materials consist of concrete and metal. Metal volume is considered minimal.
- A concrete base was associated with this unit and is still in its original location. Volume not considered.

ELEVATIONS:

Surface - 494 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5H:1.0V
No Ramp

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit, prior to demolition, was a hollow right circular cone.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.

Volume Estimate
100 BC Area

SITE NUMBER: 132-C-1

CONTAMINATED VOLUME

PROBABLE, MAXIMUM

Unit	Height ft	Radius 1 ft	Radius 2 ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Stack Material							
Outer Cone	200	8	3				700
Inner Cone	200	6	2				367
Total - concrete							334

EXCAVATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Trench Material					1.5		6,618
Top dimension	248	73	16			18,104	
Bottom dimension	200	25	16	5,000			
Total			16				6,618

Volume Estimate
100 BC Area

SITE NUMBER: 132-C-1

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	534 lcy	1500 lcy/shift	0.4	0.4
Other Clean Material	7,416 lcy	1500 lcy/shift	4.9	4.9
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	534 lcy	200 lcy/shift	2.7	2.7
Concrete Loading	534 lcy	1500 lcy/shift	0.4	0.4
TOTAL	7,949 lcy		8.3	8.3

NOTES:

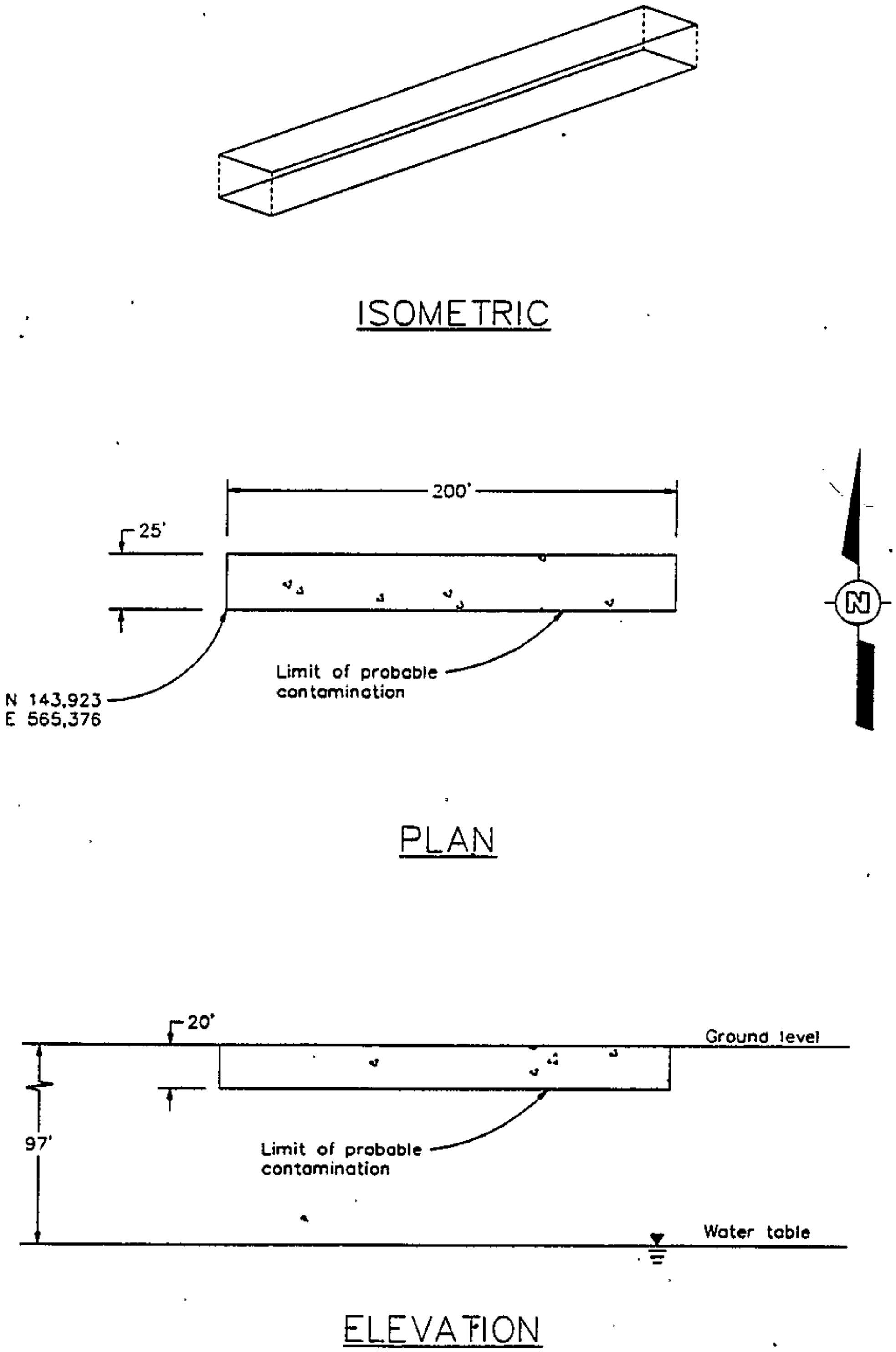
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 132-C-1

Volume Estimate
100 BC Area

SITE NUMBER: 132-C-2
SITE NAME: 1904-C Outfall Structure

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -

Length - 54 ft, assume twice the length (27 ft) of the B outfall structures.
Width - 14 ft, assume the same width (14 ft) as the B outfall structures.
Depth - 21 ft, same as B outfall structures.
Slopes - The structure was built with vertical concrete walls.
The structure was reduced to near grade level and backfilled with clean fill.

Contaminated Area -

North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - Only structure.
Probable - Structure and 5 ft of substrate below its base is contaminated.
Maximum - Structure and substrate below its base to groundwater, 46 ft below land surface.

Other Materials -

Concrete structure.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 435 ft (Ref 7).
Groundwater - 389 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER 132-C-2

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Structure						
Concrete	54	14	21	756	756	154
Backfill, Clean	54	14	21	756	756	588
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Other Materials						0
TOTAL			21			154

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Structure						
Concrete	54	14	21	756	756	154
Backfill, Clean	54	14	21	756	756	588
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	54	14	5	756	756	140
Subtotal	54	14	5	756	756	140
Other Materials						0
TOTAL			26			294

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume cy
Structure						
Concrete	54	14	21	756	756	154
Backfill, Clean	54	14	21	756	756	588
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	54	14	25	756	756	700
Subtotal	54	14	25	756	756	700
Other Materials						0
TOTAL			46			854

Volume Estimate
100 BC Area

SITE NUMBER: 132-C-2

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Structure							
Concrete & Soil	117	77	21.0	756	1.5	9,009	3,283
Subtotal							3,283
Contaminated Area							
Lateral							
Below Base of Unit							
Subtotal							
Other Materials							0
TOTAL			21.0				3,283

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Structure							
Concrete & Soil	132	92	21.0	2,001	1.5	12,144	4,986
Subtotal							4,986
Contaminated Area							
Lateral							
Below Base of Unit							
Subtotal	69	29	5.0	756	1.5	2,001	248
Other Materials							0
TOTAL			26.0				5,235

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume cy
Structure							
Concrete & Soil	192	152	21.0	11,481	1.5	29,184	15,300
Subtotal							15,300
Contaminated Area							
Lateral							
Below Base of Unit							
Subtotal	129	89	25.0	756	1.5	11,481	4,797
Other Materials							0
TOTAL			46.0				20,097

Volume Estimate
100 BC Area

SITE NUMBER: 132-C-2

**EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME**

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	412 lcy	1500 lcy/shift	0.3	0.3
Other Clean Material	5,830 lcy	1500 lcy/shift	3.9	3.9
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	246 lcy	200 lcy/shift	1.2	1.2
Concrete Loading	246 lcy	1500 lcy/shift	0.2	0.2
TOTAL	6,242 lcy		5.6	5.6

NOTES:

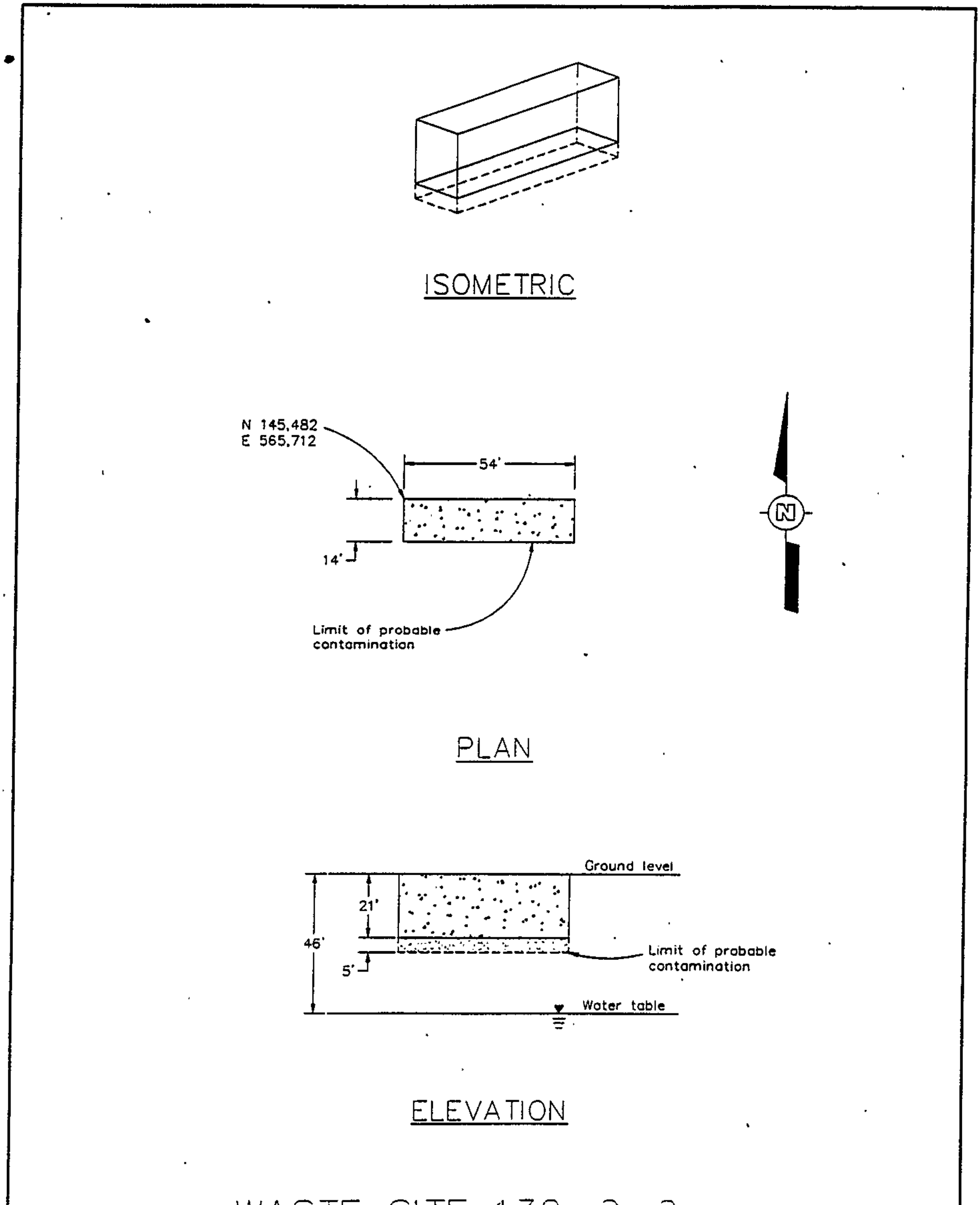
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 132-C-2

Volume Estimate
100 BC Area

SITE NUMBER: 132-C-3
SITE NAME: 117-C Filter Building

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
Length - 59 ft (Ref 1).
Width - 39 ft (Ref 1).
Depth - 35 ft (Ref 1), 27 ft below grade.
Slopes - The structure was built with vertical concrete walls.
The site was covered with 3 ft of fill after deomolition (Ref 1). Assume top of remaining foundation is 3 ft below land surface.

Contaminated Area -
North, South, East, West - Assume no lateral dispersion.
Depth -
Minimum - None.
Probable - None.
Maximum - Remaining structure: 39 ft wide, 59 ft long, and 24 ft thick; beginning 3 ft below grade. Assumed to be 100% concrete

Other Materials -
Concrete structure.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 494 ft (Ref 7).
Groundwater - 397 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit and contaminated area are assumed to be that of a rectangular solid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER 132-C-3

CONTAMINATED VOLUME

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Facility Foundation	59	39	24	2,301	2,301	2,045
Contaminated Area						
Lateral	0	0	0	0	0	0
Below Base of Unit	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0
Other Materials						0
TOTAL			24			2,045

EXCAVATED VOLUME

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Uncontaminated Cover	140	120	3	14,541	1.5	16,800	1,698
Facility Foundation	131	111	24	2,301	1.5	14,541	6,717
Contaminated Area							
Lateral				0			
Below Base of Unit				0			
Subtotal				0			
Other Materials							0
TOTAL			27				8,415

Volume Estimate
100 BC Area

SITE NUMBER: 132-C-3

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	0 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	0 lcy	1500 lcy/shift	0.0	0.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	0 lcy		0.0	0.0

NOTES:

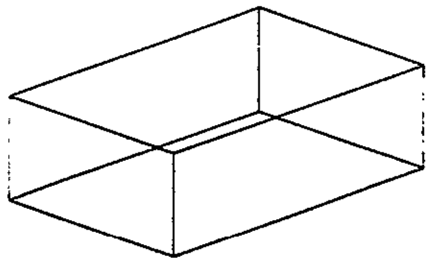
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

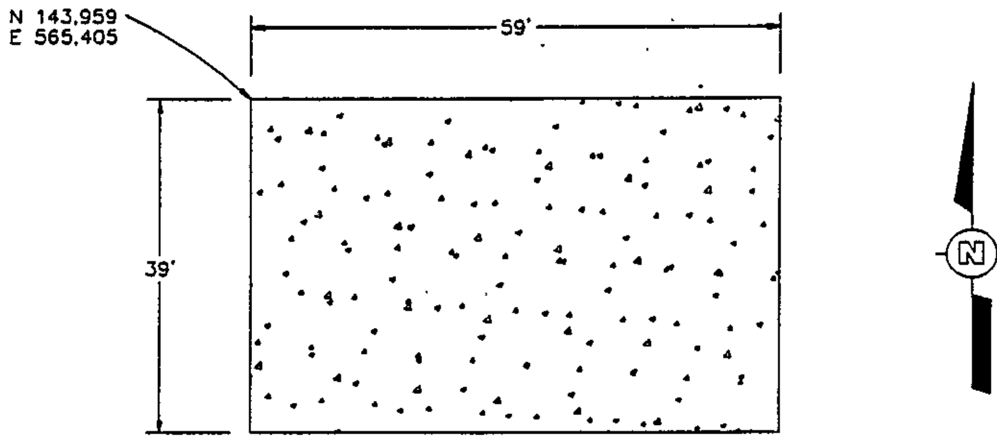
- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

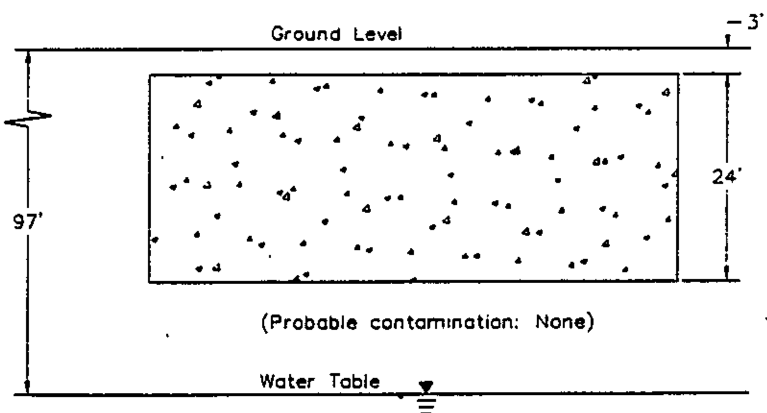
(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



ISOMETRIC



PLAN



ELEVATION

SCALE: NONE

WASTE SITE 132-C-3

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B1
SITE NAME: Septic Tank and Drain Field

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -

The septic systems includes a septic tank and tile field (WHC Dwg W-71192)
The following septic tank dimensions are taken from WHC Dwg W-71192
Length - Approximately 21.5 ft.
Width - Approximately 9 ft.
Depth - Approximately 11 ft.
Septic system has a 125 person capacity (35 gallon capacity per capita).
Tile field: (Dwg indicates to be located in field)
Minimum of 8 linear feet per capita,4 in vitrified pipe (Ref 1), 1/4 in thick, laid in a 10 x 28 in gravel bed.
Pipe leading from tank to tile field not included in volume.
Assume pipe is 3 ft below grade and 6 in of gravel is below pipe.
Overall dimensions of 200 ft long, 50 ft wide

Contaminated Area -

North, South, East, West - No lateral contamination.
Minimum - Concrete septic tank and tile field/gravel bed.
Probable - Minimum plus 5 ft of spread beneath tile field.
Maximum - Minimum plus spread down to groundwater beneath tile field.

Other Materials -

The volume of metals (manhole covers) is estimated to be negligible.
Vitrified Clay Pipe volumes included in tile field contaminated soil volumes.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 479 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.
For duration calculations, overburden layer will be removed with other material.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B1

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Concrete Septic Tank						
Walls						
Volume 1	8.67	11.83	0.83			3
Volume 2	8.67	5.92	0.83			2
Volume 3 (2X)	14.83	11.83	0.83			11
Volume 4 (2X)	5.00	5.92	0.83			2
Volume 5	7.50	6.41	0.83			1
Subtotal						19
Top	21.50	8.67	0.58			4
Weir (2X)	7.00	1.50	0.50			0
Floor						
Volume 1	7.00	14.00	0.83			3
Volume 2	7.00	5.00	0.83			1
Subtotal						4
Concrete Subtotal						27
Tile Field	1,000	2.33	0.83			72
TOTAL						99

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Concrete Septic Tank						27
Tile Field	1,000	2.33	5.83	2,333	2,333	504
TOTAL						532

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Concrete Septic Tank						27
Tile Field	1,000	2.33	79.33			6,856
TOTAL						6,883

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B1

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Sepuc Tank Excavauon					1.5		
Top Dimension	54.5	42.0				2,289	
Bottom Dimension	21.5	9.0	11.0	194			432
Tile Field Excavation							
Overburden					1.5		
Top Dimension	210.5	60.5				12,735	
Bottom Dimension	201.5	51.5	3.0	10,377			1,283
Other					1.5		
Top Dimension	201.5	51.5				10,377	
Bottom Dimension	200.0	50.0	0.5	10,000			189
Subtotal							1,471
TOTAL			3.5				1,903

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Sepuc Tank Excavauon							432
Tile Field Excavation							
Overburden					1.5		
Top Dimension	227.5	77.5				17,631	
Bottom Dimension	218.5	68.5	3.0	14,967			1,810
Other					1.5		
Top Dimension	218.5	68.5				14,967	
Bottom Dimension	200.0	50.0	6.2	10,000			2,838
Subtotal							4,648
TOTAL			9.2				5,079

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Sepuc Tank Excavauon							432
Tile Field Excavation							
Overburden					1.5		
Top Dimension	448.0	298.0				133,504	
Bottom Dimension	439.0	289.0	3.0	126,871			14,464
Other					1.5		
Top Dimension	439.0	289.0				126,871	
Bottom Dimension	200.0	50.0	79.7	10,000			173,837
Subtotal							188,300
TOTAL			82.7				188,732

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B1

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	627 lcy	1500 lcy/shift	0.4	0.4
Other Clean Material	5,367 lcy	1500 lcy/shift	3.6	3.6
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	44 lcy	200 lcy/shift	0.2	0.2
Concrete Loading	44 lcy	1500 lcy/shift	0.0	0.0
TOTAL	5,994 lcy		4.2	4.2

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B3
SITE NAME: Septic Tank and Drain Field

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -

The septic systems includes a septic tank and tile field (WHC Dwg W-71192)
The septic tank was pumped dry and demolished in 1987 (Ref 1).
Septic system has a 48 person capacity (35 gallon capacity per capita).
Tile field: (Dwg indicates to be located in field)
Minimum of 8 linear feet per capita. Assume 4 in vitrified pipe, 1/4 in thick, laid in a 10 x 24 in gravel bed
Pipe leading from tank to tile field not included in volume.
Assume pipe is 3 ft below grade and 6 in of gravel is below pipe.
Assume tile field has four lines 96 ft long spaced 10 ft apart.

Contaminated Area -

North, South, East, West - No lateral contamination.
Minimum - Tile field/gravel bed.
Probable - Minimum plus 5 ft of spread beneath tile field.
Maximum - Minimum plus spread down to groundwater beneath tile field.

Other Materials -

Vitrified Clay Pipe volumes included in tile field contaminated soil volumes.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 446 ft (Ref 7)
Groundwater - 395 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.
For duration calculations, overburden layer will be removed with other material.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B3

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Tile Field	384	2.33	0.83	896	896	28
TOTAL						28

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Tile Field	384	2.33	5.83	896	896	194
TOTAL						194

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Tile Field	384	2.33	48.83	896	896	1,621
TOTAL						1,621

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B3

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Tile Field Excavation							
Overburden					1.5		
Top Dimension	107	41				4,313	
Bottom Dimension	98	32	3	3,071			409
Other					1.5		
Top Dimension	98	32				3,071	
Bottom Dimension	96	30	1	2,880			55
TOTAL			4				464

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Tile Field Excavation							
Overburden					1.5		
Top Dimension	124	58				7,101	
Bottom Dimension	115	49	3	5,553			702
Other					1.5		
Top Dimension	115	49				5,553	
Bottom Dimension	96	30	6	2,880			950
TOTAL			9				1,652

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Tile Field Excavation							
Overburden					1.5		
Top Dimension	250	184				46,000	
Bottom Dimension	241	175	3	42,175			4,897
Other					1.5		
Top Dimension	241	175				42,175	
Bottom Dimension	96	30	48	2,880			34,054
TOTAL			51				38,951

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B3

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	228 lcy	1500 lcy/shift	0.2	0.2
Other Clean Material	1,720 lcy	1500 lcy/shift	1.1	1.1
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	1,949 lcy		1.3	1.3

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B5
SITE NAME: Septic Tank and Drain Field

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -

The septic systems includes a septic tank and tile field (WHC Dwg P-5580).
The following septic tank dimensions are assumed due to 350 gallon capactiy (WHC Dwg P-5580).
Length - Assume 4 ft.
Thickness - Assume 1/4 in.
Diameter - Assume 4 ft.
Septic system has a 350 gallon capacity (P-5580) and is a steel tank.
Tile field: Based on P-5580.
25 ft of 8 in vitrified clay pipe, 1/4 in thick, laid in a 14 in x 2 ft 8 in gravel bed.
Pipe leading from tank to tile field not included in volume.
Assume pipe is 3 ft below grade and 6 in of gravel is below pipe.

Contaminated Area -

North, South, East, West - No lateral contamination.
Minimum - None
Probable - None
Maximum - tile field plus spread down to groundwater and septic tank.

Other Materials -

Vitrified Clay Pipe volumes included in tile field contaminated soil volumes.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 428 ft (Ref 7)
Groundwater - 385 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.
For duration calculations, overburden layer will be removed with other material.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B5

CONTAMINATED VOLUME

MAXIMUM

Unit	Length ft	Width/ Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank	4	4	0.02			0.05
Displaced Volume						2
Tile Field	25	2.67	40.67			100
TOTAL						100

EXCAVATED VOLUME

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation					1.5		
Top Dimension	16	16				256	
Bottom Dimensions	4	4	4	16			17
Subtotal							17
Tile Field Excavation							
Overburden					1.5		
Top Dimension	140	136				19,040	
Bottom Dimension	133	129	2	17,105			1,606
Other					1.5		
Top Dimension	133	129				17,105	
Bottom Dimension	11	7	41	77			9,200
Subtotal							
TOTAL			43				10,839

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B7
SITE NAME: Septic Tank and Drain Field

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -

The septic systems includes a concrete tank and tile field (WHC Dwg M-1904-B.5 & W-71192).
The following septic tank dimensions are from W-71192.
Length - 6 ft
Deep - 9 ft 1 in.
Width - 3 ft.
Thick - walls = 10 in, floor = 6 in, and roof = 3 in.
Tile field: Based on 12 person capacity at 8 linear ft per capita.
96 linear feet of vitrified clay pipe, 4 in diameter, 1/4 in thick, laid in a 10 in x 2 ft 4 in gravel bed.
Pipe leading from tank to tile field not included in volume.
Assume pipe is 3 ft below grade and 6 in of gravel is below pipe.

Contaminated Area -

North, South, East, West - No lateral contamination.
Minimum - Concrete septic tank and tile field/gravel bed.
Probable - Minimum plus 5 ft of spread beneath tile field.
Maximum - Minimum plus spread down to groundwater beneath tile field.

Other Materials -

Vitrified Clay Pipe volumes included in tile field contaminated soil volumes.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 461 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1,0 V
No ramp.
For duration calculations, overburden layer will be removed with other material.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B7

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Concrete Septic Tank						
Walls						
Volume 1 (2x)	6.0	8.3	0.7			2
Volume 2 (2x)	4.3	8.3	0.7			2
Roof	4.3	6.5	0.3			0
Floor	4.3	6.5	0.5			1
Displaced Volume	4.3	6.5	9.1			9
Subtotal						5
Tile Field	96	2.3	0.8	224	224	7
TOTAL						12

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Concrete Septic Tank						5
Tile Field	96	2.33	5.83	224	224	48
TOTAL						53

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank						5
Tile Field	96	2.33	61.83	224	224	513
TOTAL						518

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B7

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation					1.5		
Top Dimension	30	34				1,021	
Bottom Dimension	3	7	9	20			133
Tile Field Excavation							
Overburden					1.5		
Top Dimension	107	13				1,367	
Bottom Dimension	99	5	3	476			90
Other					1.5		
Top Dimension	99	5				476	
Bottom Dimension	96	2	1	224			11
Subtotal			4				101
TOTAL							234

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation							133
Tile Field Excavation							
Overburden					1.5		
Top Dimension	123	29				3,532	
Bottom Dimension	115	21	3	2,385			291
Other					1.5		
Top Dimension	115	21				2,385	
Bottom Dimension	96	2	6	224			285
Subtotal							576
TOTAL			9				710

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation							133
Tile Field Excavation							
Overburden					1.5		
Top Dimension	289	195				56,451	
Bottom Dimension	281	187	3	52,641			5,386
Other					1.5		
Top Dimension	281	187				52,641	
Bottom Dimension	96	2	62	224			47,342
Subtotal							
TOTAL			64				52,862

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B7

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	65 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	774 lcy	1500 lcy/shift	0.5	0.5
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	8 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	8 lcy	1500 lcy/shift	0.0	0.0
TOTAL	839 lcy		0.6	1.0

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B8
SITE NAME: Septic Tank and Drain Field

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -

The septic systems includes a steel tank and tile field (WHC Dwg P-5580)
The following septic tank dimensions are assumed due to a 350 gallon capacity (WHC Dwg P-5580).
Length - Assume 4 ft.
Thickness - Assume 1/4 in.
Diameter - Assume 4 ft
Tile field: Based on P-5580.
90 ft of 8 in vitrified clay pipe, 1/4 in thick, laid in a 14 in x 2 ft 8 in gravel bed.
Pipe leading from tank to tile field not included in volume.
Assume pipe is 3 ft below grade and 6 in of gravel is below pipe.

Contaminated Area -

North, South, East, West - No lateral contamination.
Minimum - Concrete septic tank and tile field/gravel bed.
Probable - Minimum plus 5 ft of spread beneath tile field.
Maximum - Minimum plus spread down to groundwater beneath tile field.

Other Materials -

Vitrified Clay Pipe volumes included in tile field contaminated soil volumes.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 492 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.
For duration calculations, overburden layer will be removed with other material.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B8

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width/ Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank	4	4	0.02			0.05
Displaced Volume						2
Subtotal						0.05
Tile Field	90	2.67	1.17			10
TOTAL						10

PROBABLE

Unit	Length ft	Width/ Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank	4	4	0.02			0.05
Displaced Volume						2
Subtotal						0.05
Tile Field	90	2.67	6.17			55
TOTAL						55

MAXIMUM

Unit	Length ft	Width/ Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank	4	4	0.02			0.05
Displaced Volume						2
Subtotal						0.05
Tile Field	90	2.67	92.67			824
TOTAL						824

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B8

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation					1.5		
Top Dimension	16.0	16.0				256	
Bottom Dimension	4.0	4.0	4.0	16			17
Tile Field Excavation							
Overburden					1.5		
Top Dimension	30.5	24.5				747	
Bottom Dimension	23.5	17.5	2.3	411			49
Other					1.5		
Top Dimension	23.5	17.5				411	
Bottom Dimension	20.0	14.0	1.2	280			15
Subtotal							64
TOTAL			3.5				81

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation							17
Tile Field Excavation							
Overburden					1.5		
Top Dimension	45.5	39.5				1,797	
Bottom Dimension	38.5	32.5	2.3	1,251			131
Other					1.5		
Top Dimension	38.5	32.5				1,251	
Bottom Dimension	20.0	14.0	6.2	280			162
Subtotal							293
TOTAL			8.5				309

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation							17
Tile Field Excavation							
Overburden					1.5		
Top Dimension	305.0	299.0				91,195	
Bottom Dimension	298.0	292.0	2.3	87,016			7,700
Other					1.5		
Top Dimension	298.0	292.0				87,016	
Bottom Dimension	20.0	14.0	92.7	280			105,597
Subtotal							113,296
TOTAL			95.0				113,313

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B8

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	65 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	300 lcy	1500 lcy/shift	0.2	0.2
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0.3 tons	100 ton/shift	0.0	0.0
Metals Loading	0.3 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	365 lcy		0.2	1.0

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B9
SITE NAME: Septic Tank and Drain Field

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -

The septic systems includes a concrete tank and tile field (WHC Dwg M-1904-B.9).
The following septic tank dimensions are assumed due to a 2400 gallon capacity (WHC Dwg).
Length - Assume 10 ft
Deep - Assume 8 ft.
Width - Assume 4 ft.
Thick - Assume walls = 10 in, floor = 10 in, and roof = 7 in.
Tile field: Based on 350 gallons = 90 ft length.
617 linear feet of vitrified clay pipe, 8 in diameter, 1/4 in thick, laid in a 14 in x 2 ft 8 in gravel bed.
Pipe leading from tank to tile field not included in volume.
Assume pipe is 3 ft below grade and 6 in of gravel is below pipe.

Contaminated Area -

North, South, East, West - No lateral contamination.
Minimum - Concrete septic tank and tile field/gravel bed.
Probable - Minimum plus 5 ft of spread beneath tile field.
Maximum - Minimum plus spread down to groundwater beneath tile field.

Other Materials -

Vitrified Clay Pipe volumes included in tile field contaminated soil volumes.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 489 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.
For duration calculations, overburden layer will be removed with other material.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B9

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Concrete Septic Tank						
Walls						
Volume 1 (2x)	5.67	8	0.83			3
Volume 2 (2x)	10	8	0.83			5
Roof	11.67	5.67	0.58			1
Floor	11.67	5.67	0.83			2
Displaced Volume	11.67	5.67	9.42			23
Subtotal						11
Tile Field	617	2.67	1.17			71
TOTAL						82

PROBABLE

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Concrete Septic Tank						11
Tile Field	617	2.67	6.17			376
TOTAL						387

MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank						11
Tile Field	617	2.67	89.67			5,464
TOTAL						5,475

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B9

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation					1.5		
Top Dimension	41	35				1,410	
Bottom Dimension	12	6	10	66			214
Tile Field Excavation							
Overburden					1.5		
Top Dimension	114	61				6,867	
Bottom Dimension	107	54	2	5,698			542
Other					1.5		
Top Dimension	107	54				5,698	
Bottom Dimension	103	50	1	5,150			234
Subtotal			4				776
TOTAL							991

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation							214
Tile Field Excavation							
Overburden					1.5		
Top Dimension	129	76				9,702	
Bottom Dimension	122	69	2	8,323			778
Other					1.5		
Top Dimension	122	69				8,323	
Bottom Dimension	103	50	6	5,150			1,526
Subtotal							2,304
TOTAL			9				2,518

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation							214
Tile Field Excavation							
Overburden					1.5		
Top Dimension	379	326				123,554	
Bottom Dimension	372	319	2	118,668			10,466
Other					1.5		
Top Dimension	372	319				118,668	
Bottom Dimension	103	50	90	5,150			165,547
Subtotal							
TOTAL			92				176,227

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B9

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	461 lcy	1500 lcy/shift	0.3	0.3
Other Clean Material	2,514 lcy	1500 lcy/shift	1.7	1.7
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	18 lcy	200 lcy/shift	0.1	0.1
Concrete Loading	18 lcy	1500 lcy/shift	0.0	0.0
TOTAL	2,976 lcy		2.1	2.1

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B10
SITE NAME: Septic Tank and Drain Field

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -

The septic systems includes a steel tank and tile field (WHC Dwg P-5580)
The following septic tank dimensions are assumed due to a 350 gallon capacity (WHC Dwg P-5580).
Length - Assume 4 ft.
Thickness - Assume 1/4 in.
Diameter - Assume 4 ft
Tile field: Based on P-5580.
90 ft of 8 in vitrified clay pipe, 1/4 in thick, laid in a 14 in x 2 ft 8 in gravel bed.
Pipe leading from tank to tile field not included in volume.
Assume pipe is 3 ft below grade and 6 in of gravel is below pipe.

Contaminated Area -

North, South, East, West - No lateral contamination.
Minimum - Concrete septic tank and tile field/gravel bed.
Probable - Minimum plus 5 ft of spread beneath tile field.
Maximum - Minimum plus spread down to groundwater beneath tile field.

Other Materials -

Vitrified Clay Pipe volumes included in tile field contaminated soil volumes.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 479 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.
For duration calculations, overburden layer will be removed with other material.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B10

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width/ Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank	4	4	0.02			0.05
Displaced Volume						2
Subtotal						0.05
Tile Field	90	2.67	1.17			10
TOTAL						10

PROBABLE

Unit	Length ft	Width/ Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank	4	4	0.02			0.05
Displaced Volume						2
Subtotal						0.05
Tile Field	90	2.67	6.17			55
TOTAL						55

MAXIMUM

Unit	Length ft	Width/ Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank	4	4	0.02			0.05
Displaced Volume						2
Subtotal						0.05
Tile Field	90	2.67	79.67			708
TOTAL						708

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B10

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation					1.5		
Top Dimension	16	16				256	
Bottom Dimension	4	4	4	16			17
Tile Field Excavation							
Overburden					1.5		
Top Dimension	31	25				747	
Bottom Dimension	24	18	2	411			49
Other					1.5		
Top Dimension	24	18				411	
Bottom Dimension	20	14	1	280			15
Subtotal							64
TOTAL			4				81

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation							17
Tile Field Excavation							
Overburden					1.5		
Top Dimension	46	40				1,797	
Bottom Dimension	39	33	2	1,251			131
Other					1.5		
Top Dimension	39	33				1,251	
Bottom Dimension	20	14	6	280			162
Subtotal							293
TOTAL			9				309

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation							17
Tile Field Excavation							
Overburden					1.5		
Top Dimension	266	260				69,160	
Bottom Dimension	259	253	2	65,527			5,819
Other					1.5		
Top Dimension	259	253				65,527	
Bottom Dimension	20	14	80	280			68,995
Subtotal							
TOTAL			82				74,831

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B10

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	65 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	300 lcy	1500 lcy/shift	0.2	0.2
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0.3 tons	100 ton/shift	0.0	0.0
Metals Loading	0.3 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	365 lcy		0.2	1.0

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B11
SITE NAME: Septic Tank and Drain Field

CONTAMINATED DIMENSION ASSUMPTIONS:

Unit -
The septic systems includes a steel tank and tile field (WHC Dwg P-5580)
The following septic tank dimensions are assumed due to a 350 gallon capacity (WHC Dwg P-5580).
Length - Assume 4 ft.
Thickness - Assume 1/4 in.
Diameter - Assume 4 ft
Tile field: Based on P-5580.
25 ft of 8 in vitrified clay pipe, 1/4 in thick, laid in a 14 in x 2 ft 8 in gravel bed.
Pipe leading from tank to tile field not included in volume.
Assume pipe is 3 ft below grade and 6 in of gravel is below pipe.

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum - Concrete septic tank and tile field/gravel bed.
Probable - Minimum plus 5 ft of spread beneath tile field.
Maximum - Minimum plus spread down to groundwater beneath tile field.

Other Materials -
Vitrified Clay Pipe volumes included in tile field contaminated soil volumes.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 484 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.
For duration calculations, overburden layer will be removed with other material.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B11

CONTAMINATED VOLUME

MINIMUM

Unit	Length ft	Width/ Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank	4	4	0.02			0.05
Displaced Volume						2
Subtotal						0.05
Tile Field	25	2.67	1.17			3
TOTAL						3

PROBABLE

Unit	Length ft	Width/ Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank	4	4	0.02			0.05
Displaced Volume						2
Subtotal						0.05
Tile Field	25	2.67	6.17			15
TOTAL						15

MAXIMUM

Unit	Length ft	Width/ Diameter ft	Thickness ft	Bottom Area sf	Top Area sf	Volume bcy
Steel Septic Tank	4	4	0.02			0.05
Displaced Volume						2
Subtotal						0.05
Tile Field	25	2.67	84.67			209
TOTAL						209

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B11

EXCAVATED VOLUME

MINIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation					1.5		
Top Dimension	16	16				256	
Bottom Dimension	4	4	4	16			17
Tile Field Excavation							
Overburden					1.5		
Top Dimension	36	13				467	
Bottom Dimension	29	6	2	176			27
Other					1.5		
Top Dimension	29	6				176	
Bottom Dimension	25	3	1	67			5
Subtotal							
TOTAL			4				22

PROBABLE

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation							17
Tile Field Excavation							
Overburden					1.5		
Top Dimension	51	28				1,422	
Bottom Dimension	44	21	2	921			101
Other					1.5		
Top Dimension	44	21				921	
Bottom Dimension	25	3	6	67			100
Subtotal							200
TOTAL			9				217

MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Septic Tank Excavation							17
Tile Field Excavation							
Overburden					1.5		
Top Dimension	286	264				75,409	
Bottom Dimension	279	257	2	71,610			6,352
Other					1.5		
Top Dimension	279	257				71,610	
Bottom Dimension	25	3	85	67			78,664
Subtotal							
TOTAL			87				85,032

Volume Estimate
100 BC Area

SITE NUMBER: 1607-B11

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	18 lcy	1500 lcy/shift	0.0	0.0
Other Clean Material	238 lcy	1500 lcy/shift	0.2	0.2
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0.3 tons	100 ton/shift	0.0	0.0
Metals Loading	0.3 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	256 lcy		0.2	1.0

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-1
SITE NAME: 105-B Burial Ground

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
21 trenches running East/West
Length - 250 ft at top (R. Wahlen)
Width - 10 ft at base (R. Wahlen).
Depth - 20 ft deep (Ref 1).
Slopes - 1.0H:1.5V
3 trenches running North/South
Length - 160 ft at top.
Width - 16 ft at top.
Depth - 8 ft deep
Slopes - 1.0H/1.0V
Perforated Burials - No data.
Spline Silos
Metal Culverts with a 5-6 ft radius (Ref 1).
Burial ground has been covered with a minimum of 4 ft of fill.

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum, Probable, and Maximum are the same.
Depth -
Assume burial ground trench filled to 4 ft prior to fill covering.
Volume not calculated for Perforated Burials and Spline Silos, assumed to be included in Trench volumes.

Other Materials -
75% of material is non-metals (soft waste), 25% is metals. 1 bank cubic yard metals = 1.6 tons
Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 479 ft (Ref 1,7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Assume excavation with bottom footprint of a polygon with sides measuring 940 x 270 x 50 x 160 x 50 x 680 x 270.
Excavation Slopes - 1.5H/1.0V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-1

CONTAMINATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
21 Trenches					0.67		
Top dimension	250	37	20			9,167	
Bottom dimension	223	10	20	2,233			
Subtotal							86,823
3 Trenches					1.0		
Top dimension	160	16	8			2,560	
Bottom dimension	144	0	8	0			
Subtotal							1,100
Subtotal - Metal							21,981
Subtotal - Soft Waste							65,942
TOTAL							87,923

EXCAVATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden #1					1.5		
	1,012	342	4	330,000		346,104	50,078
Excavated Material #1					1.5		
Top dimension	1,000	330	4			330,000	
Bottom dimension	940	270	20	253,800			
Subtotal							215,778
Overburden #2					1.5		
	232	122	4	24,200		28,304	3,886
Excavated Material #2					1.5		
Top dimension	220	110	4			24,200	
Bottom dimension	160	50	20	8,000			
Subtotal							11,481
TOTAL			24				281,223

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-1

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
24	4	1.5	10	40	40	34	3.4	109

Sub-Volume I	86
Sub-Volume II	7
Sub-Volume III	15
Sub-Volume IV	1

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-1

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	63,677 lcy	2000 lcy/shift	31.8	31.8
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	114,300 lcy	1000 lcy/shift	114.3	114.3
Other Clean Material	164,417 lcy	1000 lcy/shift	164.4	164.4
Ramp	129 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	35,169 tons	100 ton/shift	351.7	351.7
Metals Loading	35,169 tons	900 ton/shift	39.1	39.1
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	342,523 lcy		701.4	701.4

NOTES:

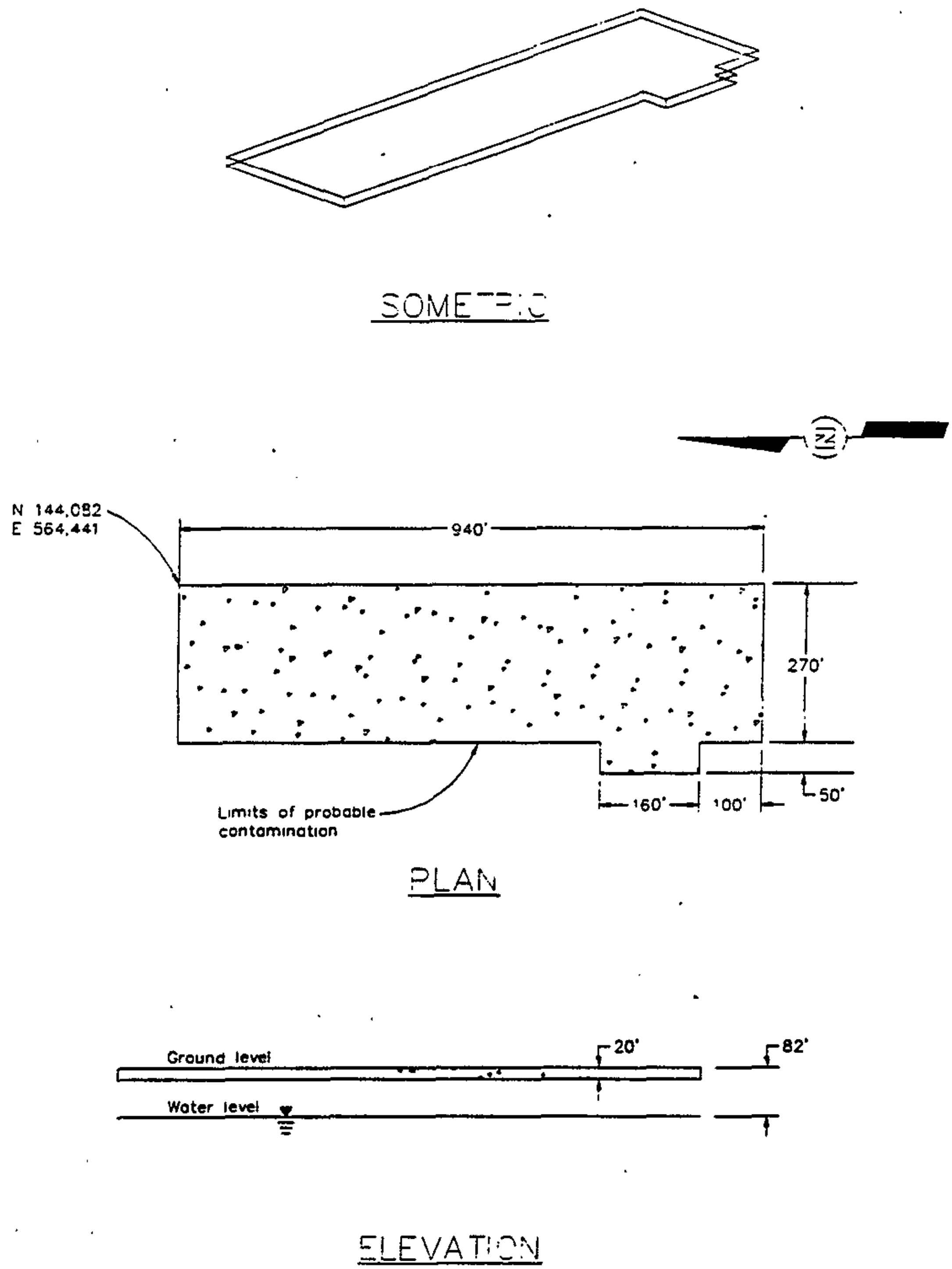
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 118-B-1

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-2
SITE NAME: Construction Burial Ground #1

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
Length - 60 ft at base(Ref 1)
Width - 30 ft at base (Ref 1).
Depth - 10 ft deep (Ref 1).
Assume 1.0H:1.0V
Burial ground has been covered with a minimum of 4 ft of fill (Ref 1).

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum, Probable, and Maximum are the same.
Depth -
Burial ground trench filled to 10 ft prior to fill covering.

Other Materials -
75% of material is non-metals (soft waste), 25% is metals (Ref 8).

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 469 ft (Ref 1,7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-2

CONTAMINATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Material					1.0		
Top dimension	80	50	10			4,000	
Bottom dimension	60	30	10	1,800			1,049
Subtotal Soft Waste							787
Subtotal Metal							262
TOTAL							1,049

EXCAVATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	102	72	4	5,400	1.5	7,344	940
Trench Material							
Top dimension	90	60	10		1.5	5,400	
Bottom dimension	60	30	10	1,800	1.5		
Subtotal							1,278
TOTAL			14				2,218

Volume Estimate
100 BC Area

SITE NUMBER 118-B-2

RAMP VOLUME

Excavatio Depth (ft)	Ramp Depth (ft)	Excavatio Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
14	4	1.5	10	40	40	34	3.4	109

Sub-Volume I	86
Sub-Volume II	7
Sub-Volume III	15
Sub-Volume IV	1

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-2

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	1,110 lcy	2000 lcy/shift	0.6	0.6
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	1,364 lcy	1000 lcy/shift	1.4	1.4
Other Clean Material	270 lcy	1000 lcy/shift	0.3	0.3
Ramp	129 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	420 tons	100 ton/shift	4.2	4.2
Metals Loading	420 tons	900 ton/shift	0.5	0.5
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	2,872 lcy		6.9	6.9

NOTES:

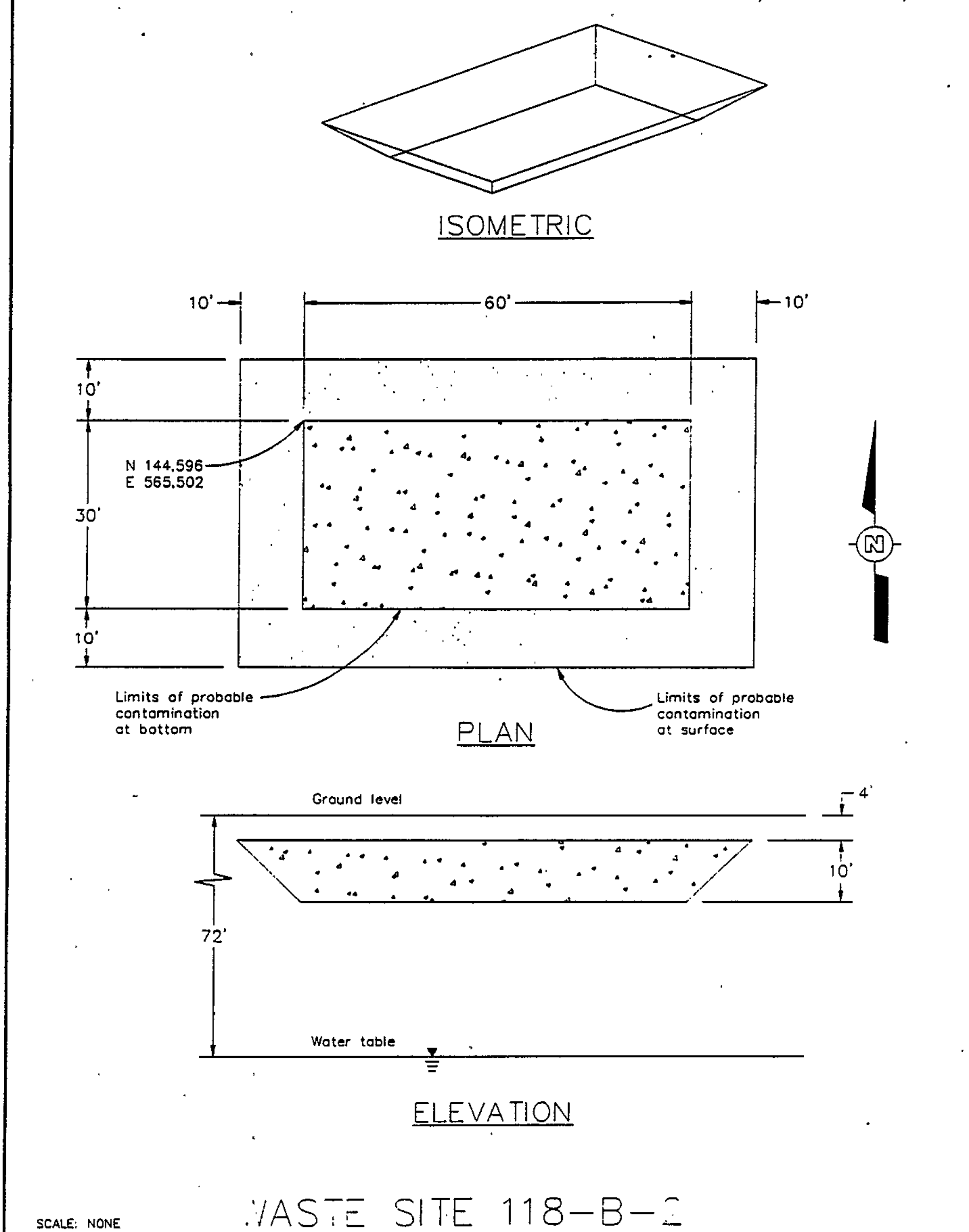
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 118-B-2

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-3
SITE NAME: Construction Burial Ground #2

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
- Length - 350 ft at base(Ref 1)
- Width - 275 ft at base (Ref 1).
- Depth - 20 ft deep (Ref 1).
- Assume 1.0H:1.0V
- Burial ground has been covered with a minimum of 4 ft of fill (Ref 1).

Contaminated Area -
- North, South, East, West - No lateral contamination.
- Minimum. Probable, and Maximum are the same.
- Depth - 20 ft deep (Ref 1).

Other Materials -
- 75% of material is non-metals (soft waste), 25% is metals (Ref 8).

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 472 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-3

CONTAMINATED VOLUME

MINIMUM. PROBABLE. MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Material					1.0		
Top dimension	390	315	20			122,850	
Bottom dimension	350	275	20	96,250			80,951
Subtotal Soft Waste							60,713
Subtotal Metal							20,238
TOTAL							80,951

EXCAVATED VOLUME

MINIMUM. PROBABLE. MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	422	347	4	137,350	1.5	146,434	21,017
Trench Material							
Top dimension	410	335	20		1.5	137,350	
Bottom dimension	350	275	20	96,250	1.5		
Subtotal							86,074
TOTAL			24				107,092

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-3

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
24	4	1.5	10	40	40	34	3.4	109

Sub-Volume I	86
Sub-Volume II	7
Sub-Volume III	15
Sub-Volume IV	1

NOTES:

See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-3

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	24,801 lcy	2000 lcy/shift	12.4	12.4
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	105,236 lcy	1000 lcy/shift	105.2	105.2
Other Clean Material	6,046 lcy	1000 lcy/shift	6.0	6.0
Ramp	129 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	32,380 tons	100 ton/shift	323.8	323.8
Metals Loading	32,380 tons	900 ton/shift	36.0	36.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	136,211 lcy		483.5	483.5

NOTES:

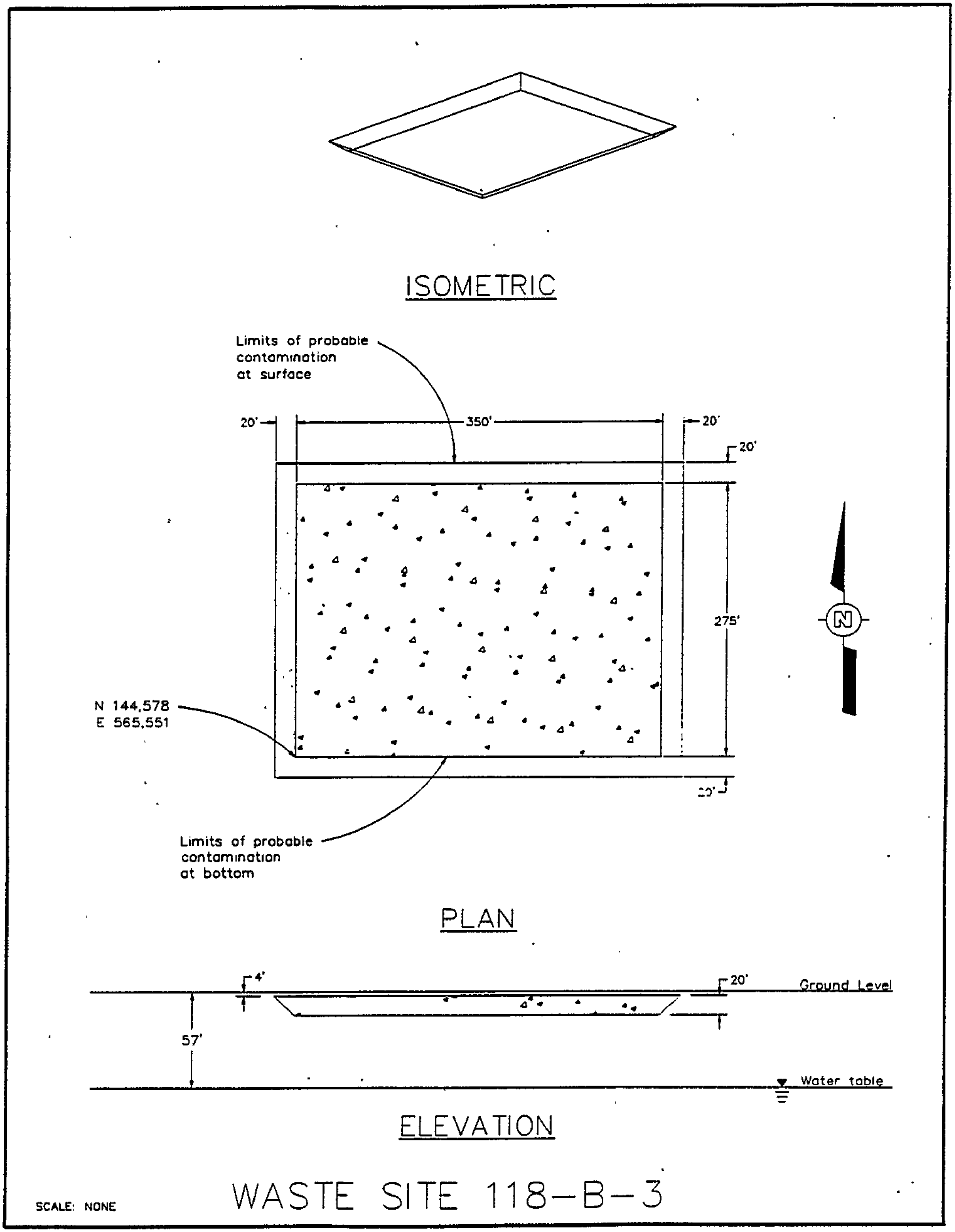
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 118-B-3

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-4
SITE NAME: Spacer Burial Ground

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
Consists of 6 pits installed below grade.
Diameter - 6 ft(Ref 1).
Depth - 15 ft deep (Ref 1).

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum, Probable, and Maximum are the same.
Depth - 15 ft deep (Ref 1).

Other Materials -
Assume 100 % of material is metal waste.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 472 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
No ramp.

VOLUME CALCULATION ASSUMPTIONS:

The shape of each unit is assumed to be that of a cylinder.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-4

CONTAMINATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Diameter ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
6 Pit Material				Vertical		
Top dimension	6	15			28	
Bottom dimension	6	15	28			16
Subtotal Metal						94
TOTAL		15				94

EXCAVATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Trench Material							
Top dimension	95	75			1.5	7,125	
Bottom dimension	50	30	15	1,500			2,208
TOTAL			15				2,208

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-4

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
0	0	1.5	10	40	0	0	0	0

Sub-Volume I	0
Sub-Volume II	0
Sub-Volume III	0
Sub-Volume IV	0

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-4

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	123 lcy	1000 lcy/shift	0.1	0.1
Other Clean Material	2,495 lcy	1000 lcy/shift	2.5	2.5
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	151 tons	100 ton/shift	1.5	1.5
Metals Loading	151 tons	900 ton/shift	0.2	0.2
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	2,617 lcy		4.3	4.3

NOTES:

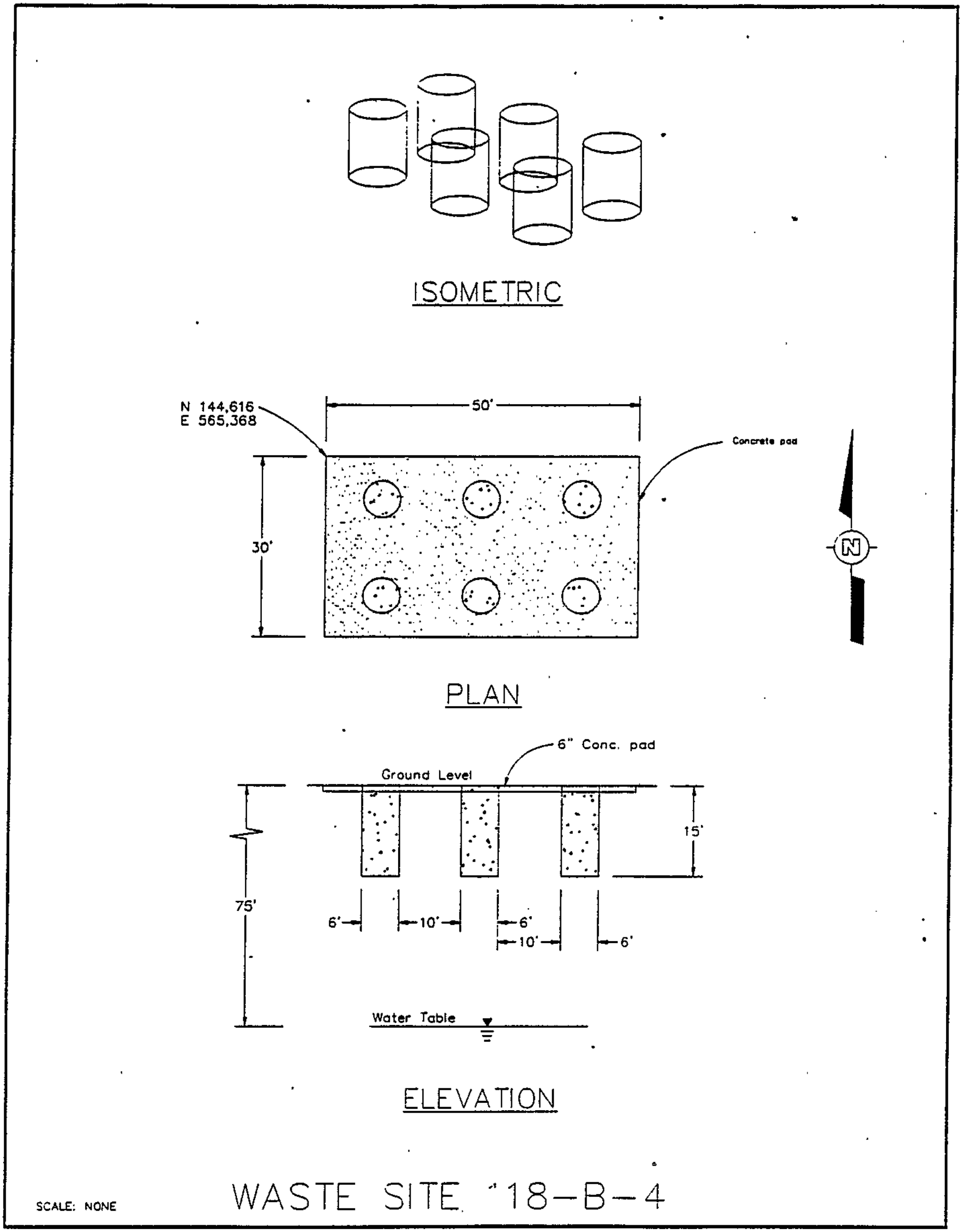
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.


ISOMETRIC
N 144,616
E 565,368
50'
Concrete pad
30'
PLAN
6" Conc. pad
Ground Level
15'
75'
6'
10'
6'
10'
6'
Water Table
ELEVATION
SCALE: NONE
WASTE SITE 118-B-4

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-5
SITE NAME: Ball 3X Burial Ground

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
Length - 50 ft at base(Ref 1)
Width - 50 ft at base (Ref 1).
Depth - 20 ft deep (Ref 1).
Assume 1.0H:1.0V
Burial ground has been covered with 5 ft of fill (Ref 1).

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum, Probable, and Maximum are the same.
Depth - 20 ft deep (Ref 1).

Other Materials -
Assume all metals in burial ground.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 476 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-5

CONTAMINATED VOLUME

MINIMUM. PROBABLE. MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Material					1.0		
Top dimension	90	90	20			8,100	
Bottom dimension	50	50	20	2,500			3,728
TOTAL - Metal			20				3,728

EXCAVATED VOLUME

MINIMUM. PROBABLE. MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Overburden	125	125	5	12,100	1.5	15,625	2,560
Excavated Material					1.5		
Top dimension	110	110				12,100	
Bottom dimension	50	50	20	2,500			4,963
TOTAL			25				7,523

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-5

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
25	5	1.5	10	40	50	42.5	4.25	174

Sub-Volume I	134
Sub-Volume II	14
Sub-Volume III	24
Sub-Volume IV	2

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-5

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	3,021 lcy	2000 lcy/shift	1.5	1.5
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	4,847 lcy	1000 lcy/shift	4.8	4.8
Other Clean Material	1,457 lcy	1000 lcy/shift	1.5	1.5
Ramp	205 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	5,965 tons	100 ton/shift	59.7	59.7
Metals Loading	5,965 tons	900 ton/shift	6.6	6.6
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	9,530 lcy		74.2	74.2

NOTES:

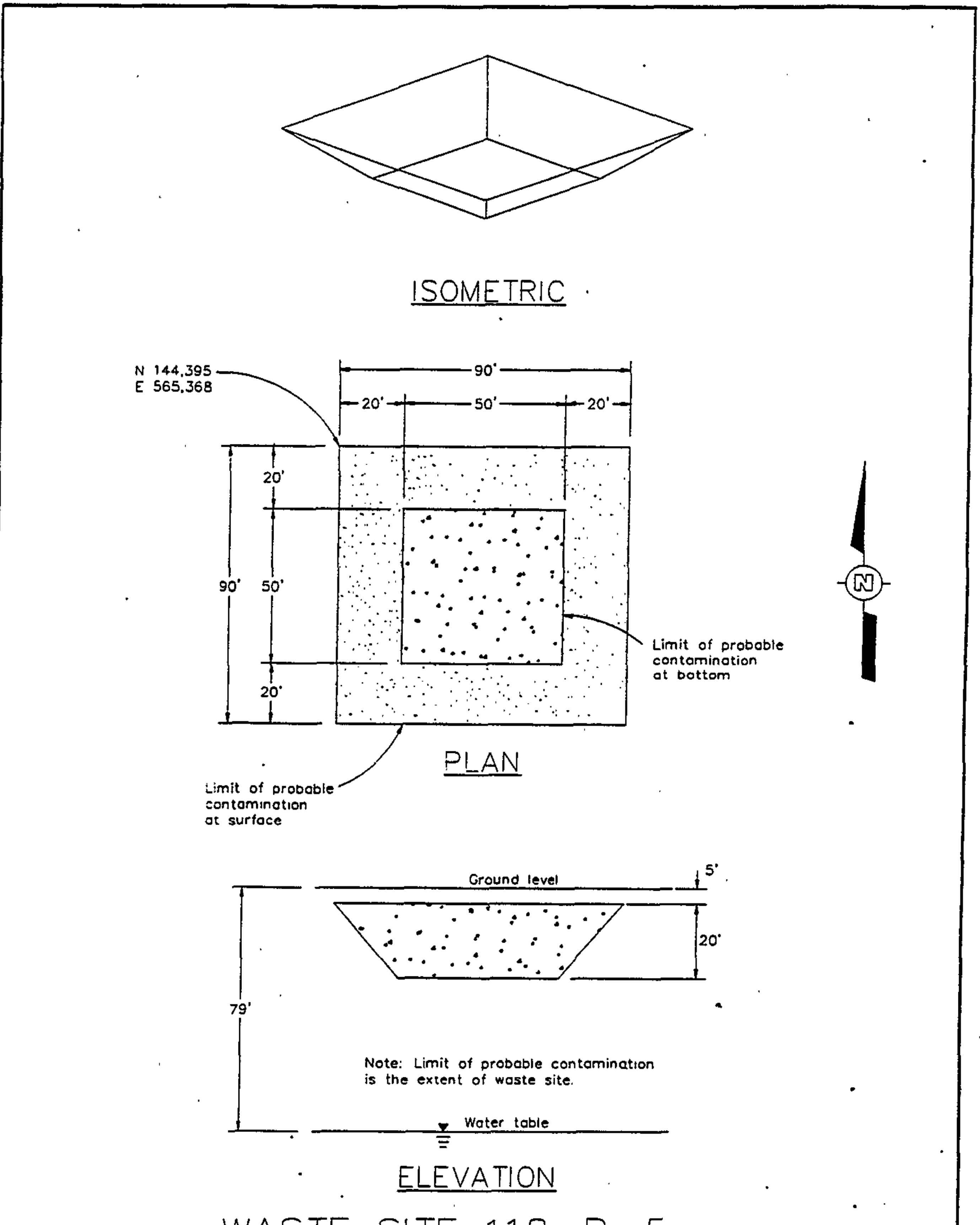
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 118-B-5

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-6
SITE NAME: 108-B Solid Waste Burial Ground

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
Consists of 2 concrete pipes buried vertically below grade, 4 ft apart.
Diameter - 6 ft(Ref 1).
Depth - 18 ft deep (Ref 1).
Light metal cap placed over pipes in concrete pad.

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum, Probable, and Maximum are the same.
Depth - 18 ft deep (Ref 1).
Top of unit assumed to be at surface.

Other Materials -
Assume 100 % of material is metal waste.
Assume concrete pad is not contaminated.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 466 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of each unit is assumed to be that of a cone.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-6

CONTAMINATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Diameter ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
2 Pit Material				0		
Top dimension	6	18			28	
Bottom dimension	6	18	28			19
Subtotal						38
TOTAL - Metal		18				38

EXCAVATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	82	79	4	4,655	1.5	6,437	818
Excavated Material							
Top dimension	70	67	18		1.5	4,655	
Bottom dimension	16	13	18	200			1,294
TOTAL			22				2,112

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-6

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
22	4	1.5	10	40	40	34	3.4	109

Sub-Volume I	86
Sub-Volume II	7
Sub-Volume III	15
Sub-Volume IV	1

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-6

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	965 lcy	2000 lcy/shift	0.5	0.5
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	49 lcy	1000 lcy/shift	0.0	0.0
Other Clean Material	1.483 lcy	1000 lcy/shift	1.5	1.5
Ramp	129 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	60 tons	100 ton/shift	0.6	0.6
Metals Loading	60 tons	900 ton/shift	0.1	0.1
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	2,626 lcy		2.7	2.7

NOTES:

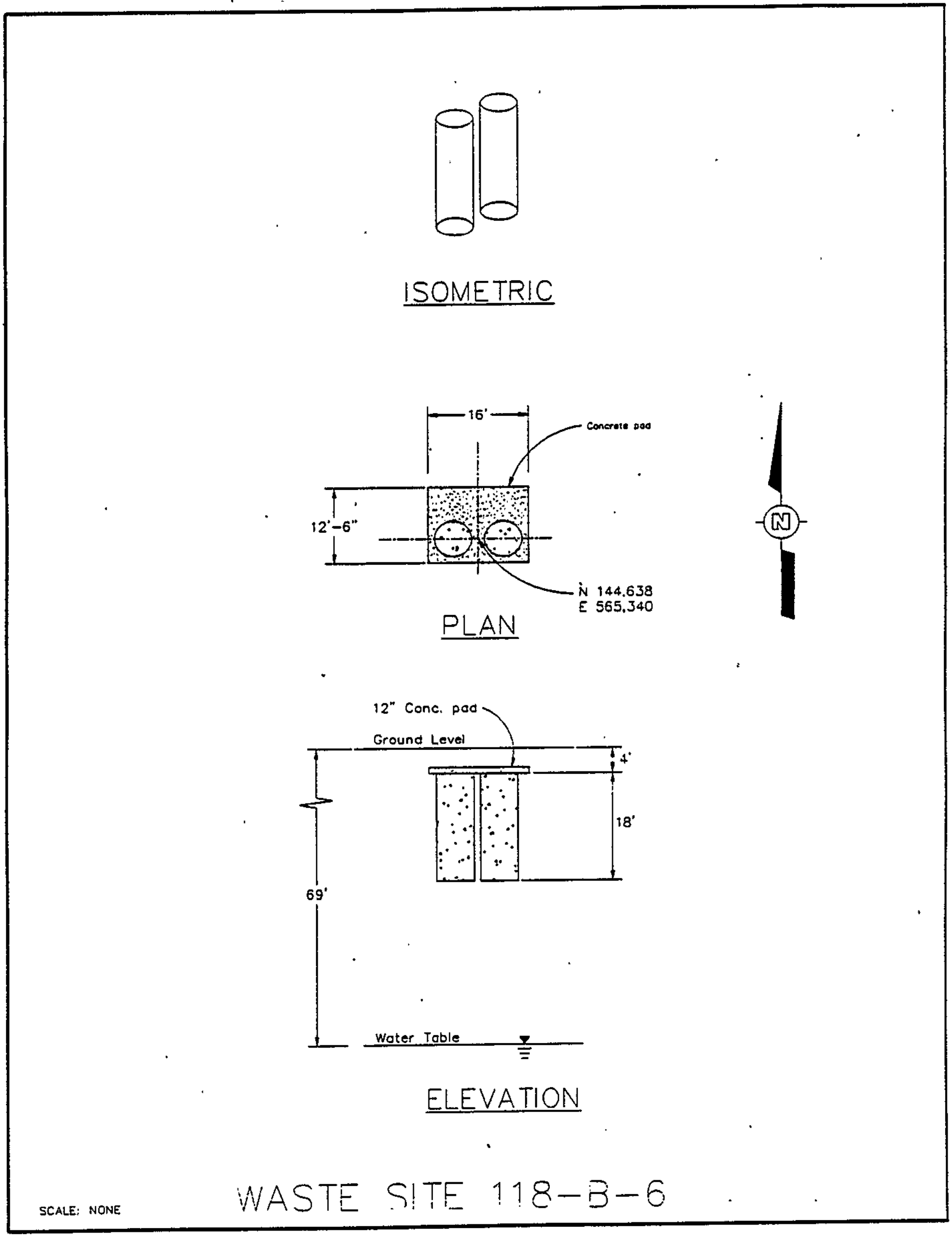
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 118-B-6

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-7
SITE NAME: 111-B Solid Waste Burial Ground

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
- Length - 8 ft at base(Ref 1)
- Width - 8 ft at base (Ref 1).
- Depth - 8 ft deep (Ref 1).
- Assume 1.0H:1.0V
- Assume 5 ft of fill.

Contaminated Area -
- North, South, East, West - No lateral contamination.
- Minimum, Probable, and Maximum are the same.
- Depth - 13 ft below land surface (Ref 1).

Other Materials -
- Assume 25% metals and 75% non-metals (soft waste).

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 476 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-7

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
13	5	1.5	10	40	50	42.5	4.25	174

Sub-Volume I	134
Sub-Volume II	14
Sub-Volume III	24
Sub-Volume IV	2

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-7

CONTAMINATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Material					1.0		
Top dimension	24	24	8			576	
Bottom dimension	8	8	8	64			82
Subtotal Soft Waste							62
Subtotal Metal							21
TOTAL			8				82

EXCAVATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	47	47	5	1,024	1.5	2,209	292
Excavated Material							
Top dimension	32	32	8		1.5	1,024	
Bottom dimension	8	8	8	64	1.5		133
TOTAL			13				425

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-7

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	345 lcy	2000 lcy/shift	0.2	0.2
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	107 lcy	1000 lcy/shift	0.1	0.1
Other Clean Material	60 lcy	1000 lcy/shift	0.1	0.1
Ramp	205 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	33 tons	100 ton/shift	0.3	0.3
Metals Loading	33 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	717 lcy		0.8	1.0

NOTES:

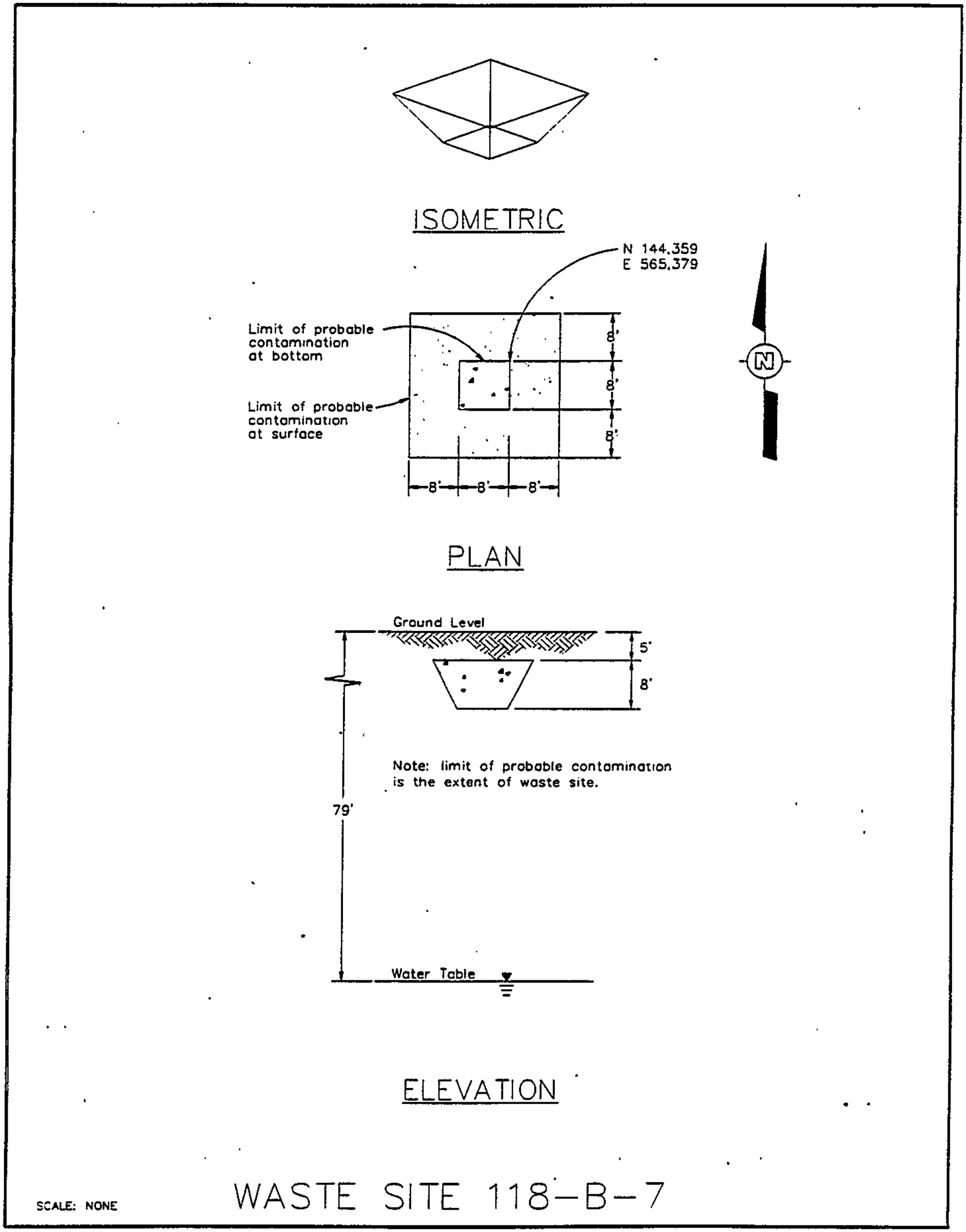
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 118-B-7

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-10
SITE NAME: Pit/Burial Ground

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
- Length - 48 ft at base(Ref 1)
- Width - 18 ft at base (Ref 1).
- Depth - Assumed 20 ft deep.
- Assume 1.0H:1.0V
- Assume 5 ft of fill with 3 ft mound (Ref 1).

Contaminated Area -
- North, South, East, West - No lateral contamination.
- Minimum, Probable, and Maximum are the same.
- Depth - 28 ft below grade.

Other Materials -
- Assume 25% metals and 75% non-metals (soft waste).

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 472 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-10

CONTAMINATED VOLUME

MINIMUM. PROBABLE. MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Material					1.0		
Top dimension	88	58	20			5,104	
Bottom dimension	48	18	20	864			2,013
Subtotal - Soft Waste							1,510
Subtotal - Metal							503
TOTAL			20				2,013

EXCAVATED VOLUME

MINIMUM. PROBABLE. MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	132	102	8	8,424	1.5	13,464	3,214
Trench Material							
Top dimension	108	78	20		1.5	8,424	
Bottom dimension	48	18	20	864	1.5		2,996
TOTAL			28				6,210

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-10

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
28	8	1.5	10	40	80	68	6.8	471

Sub-Volume I	343
Sub-Volume II	58
Sub-Volume III	60
Sub-Volume IV	10

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-B-10

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	3,793 lcy	2000 lcy/shift	1.9	1.9
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	2,617 lcy	1000 lcy/shift	2.6	2.6
Other Clean Material	1,160 lcy	1000 lcy/shift	1.2	1.2
Ramp	556 lcy	2000 lcy/shift	0.3	0.3
Misc Material Handling				
Metals Demolition	805 tons	100 ton/shift	8.1	8.1
Metals Loading	805 tons	900 ton/shift	0.9	0.9
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	8,125 lcy		14.9	14.9

NOTES:

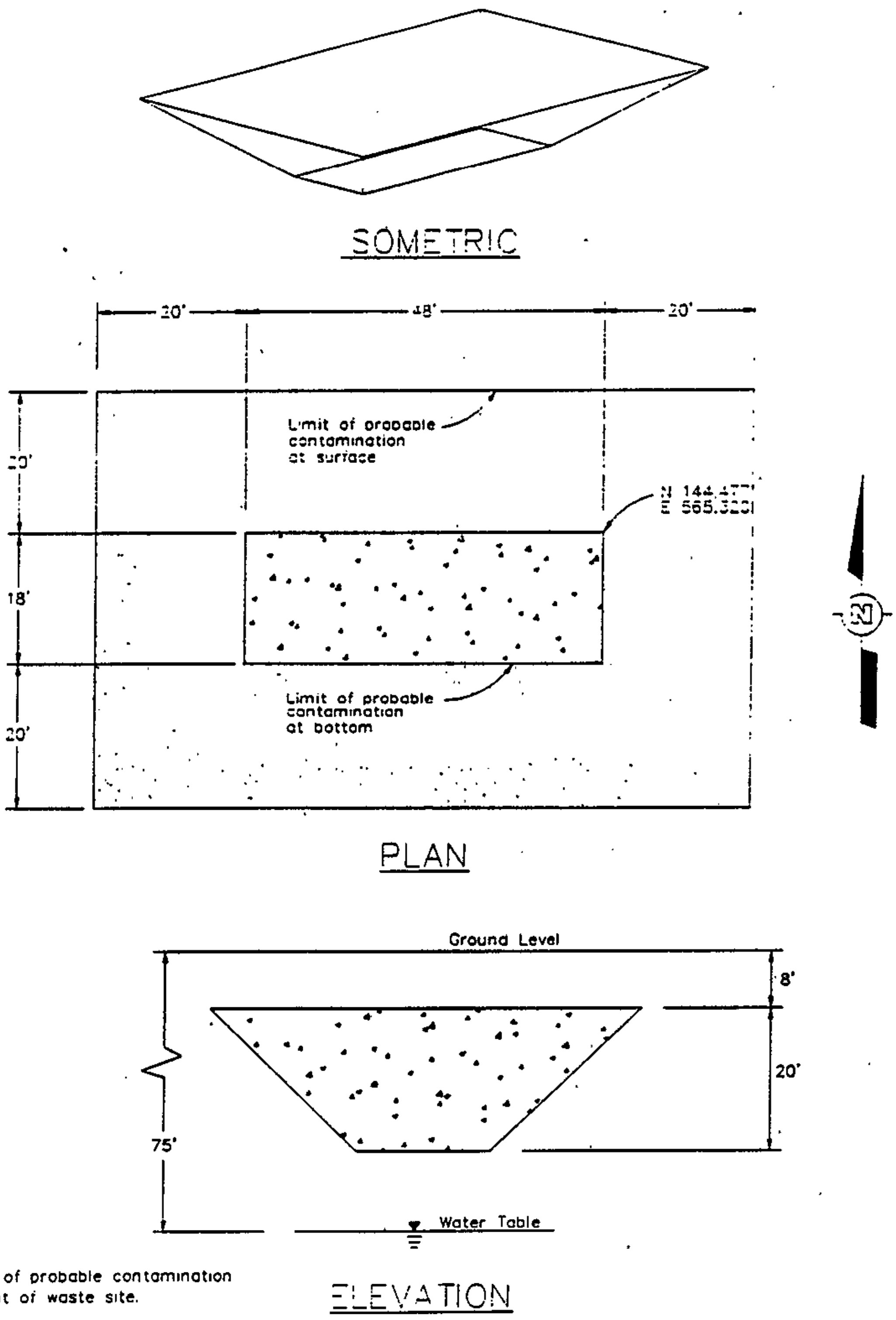
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



Note: Limit of probable contamination is the extent of waste site.

SCALE: NONE

WASTE SITE 118-B-10

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-1
SITE NAME: 105-C Burial Ground

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
6 Trenches running North/South (assume).
Length - 300 ft at base (Ref 1).
Width - 20 ft at base (Ref 1).
Depth - 20 ft deep (Ref 1).
Assumed Slopes - 1.0H/1.0V
6 Pits
Length - 10 ft at base (Ref 1).
Width - 10 ft at base (Ref 1).
Depth - 20 ft deep (Ref 1).
Assumed Slopes 1.0H/1.0V

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum, Probable, and Maximum are the same.
Burial ground trench filled to 4 ft prior to fill covering.

Other Materials -
75% of material is non-metals (soft waste), 25% is metals.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:
Surface - 495 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:
Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-1

CONTAMINATED VOLUME

MINIMUM. PROBABLE. MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Materials (6)					1.0		
Top dimension	340	60	20			20,400	
Bottom dimension	300	20	20	6,000			57,481
Pit Materials (6)					1.0		
Top dimension	50	50	20			2,500	
Bottom dimension	10	10	20	100			4,593
Subtotal Soft Waste							46,556
Subtotal Metal							15,519
TOTAL			20				62,074

EXCAVATED VOLUME

MINIMUM. PROBABLE. MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	572	472	4	257,600	1.5	269,984	39,077
Trench Material							
Top dimension	560	460	20		1.5	257,600	
Bottom dimension	500	400	20	200,000	1.5		169,037
TOTAL			24				208,114

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-1

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
24	4	1.5	10	40	40	34	3.4	109

Sub-Volume I	86
Sub-Volume II	7
Sub-Volume III	15
Sub-Volume IV	1

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-1

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	46.111 lcy	2000 lcy/shift	23.1	23.1
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	80.696 lcy	1000 lcy/shift	80.7	80.7
Other Clean Material	126.216 lcy	1000 lcy/shift	126.2	126.2
Ramp	129 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	24,830 tons	100 ton/shift	248.3	248.3
Metals Loading	24,830 tons	900 ton/shift	27.6	27.6
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	253.152 lcy		505.9	505.9

NOTES:

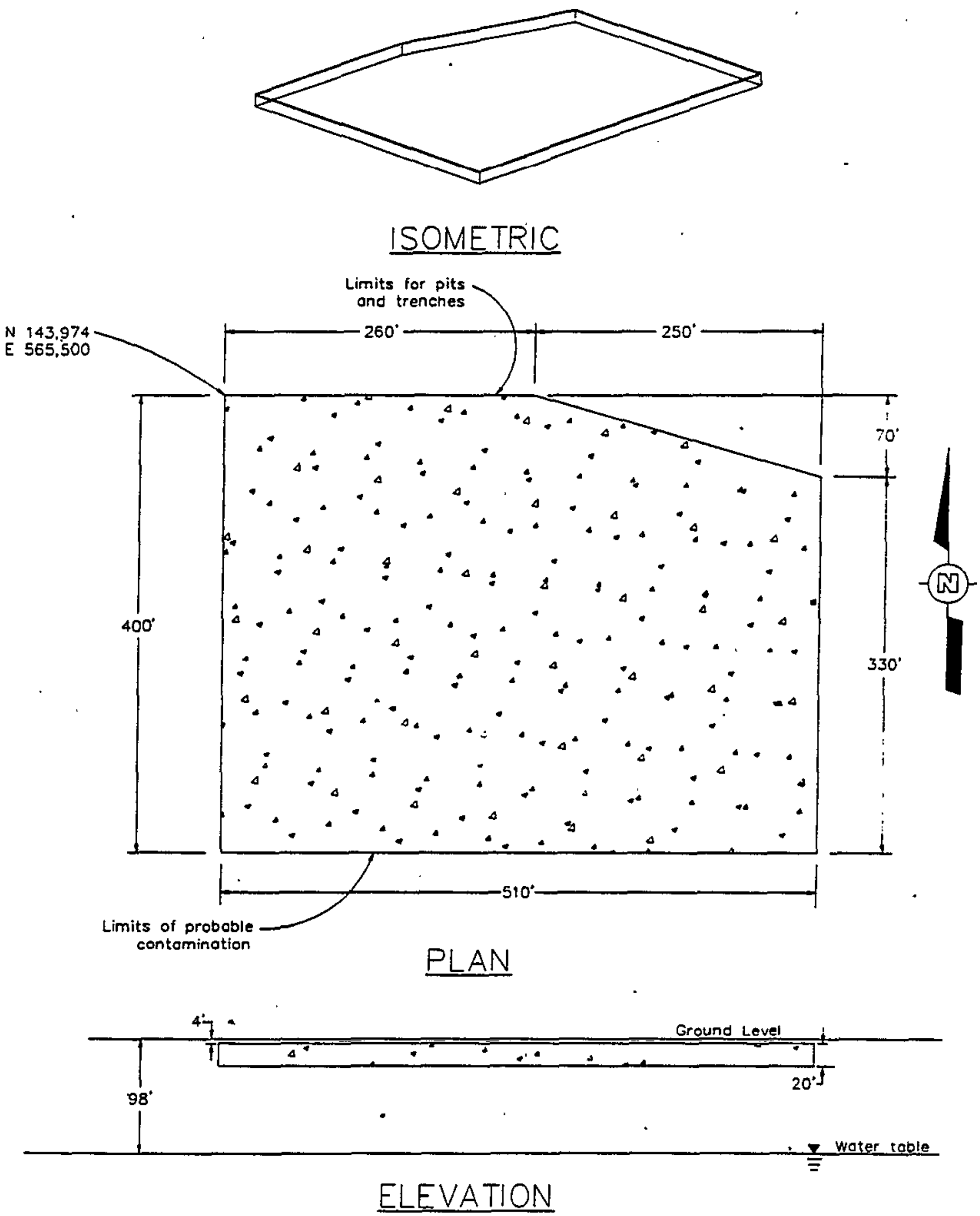
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 118-C-1

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-2
SITE NAME: 105-C Ball Storage Tank

CONTAMINATED DIMENSION ASSUMPTIONS:

Tank
Diameter - 6 ft(Ref 1).
Depth - 5 ft deep (Ref 1).
2 ft of fill mounded on top of tanks (Ref 1).
Two standpipes are visible from surface (Ref 1).

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum, Probable, and Maximum are the same.
Depth - 7 ft (Ref 1).

Other Materials -
Assume 100 % of material is metal waste (boron balls).

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 492 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5H/1.0V
No ramp.
For duration calculations, overburden layer will be removed with other material.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a cylinder.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-2

CONTAMINATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Diameter ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Tank Material				0		
Top dimension	6	5			28	
Bottom dimension	6	5	28			5
TOTAL - Metal		5				5

EXCAVATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden			2	28	Mound	28	2
Tank Layer							
Top dimension	21	21	5		1.5	441	
Bottom dimension	6	6	5	28			37
TOTAL			7				39

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-2

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
0	0	1.5	10	40	0	0	0	0

Sub-Volume I	0
Sub-Volume II	0
Sub-Volume III	0
Sub-Volume IV	0

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 118-C-2

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	7 lcy	1000 lcy/shift	0.0	0.0
Other Clean Material	40 lcy	1000 lcy/shift	0.0	0.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	8 tons	100 ton/shift	0.1	0.1
Metals Loading	8 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	47 lcy		0.1	1.0

NOTES:

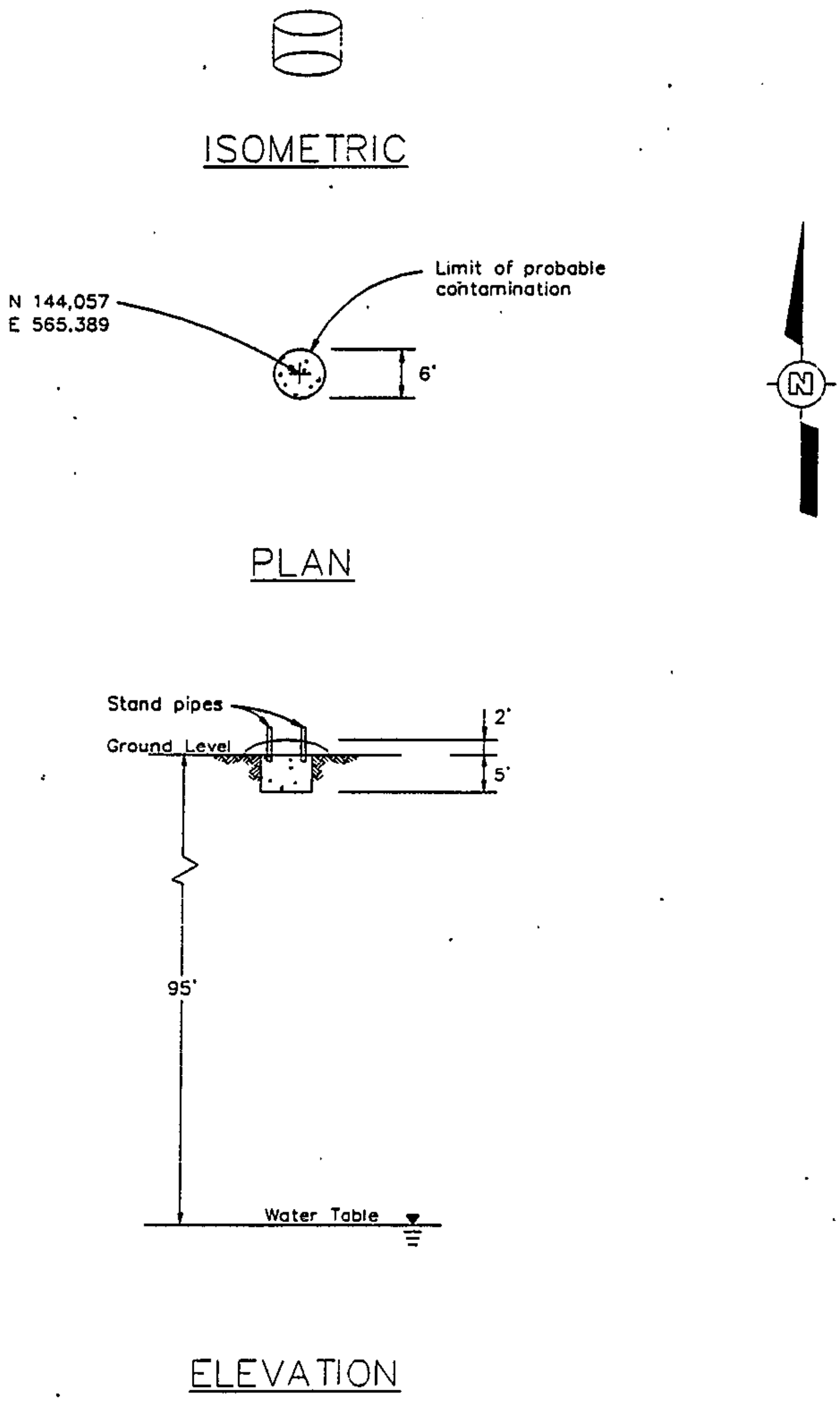
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 118-C-2

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-1
SITE NAME: 184-B Power House Ash Pit

CONTAMINATED DIMENSION ASSUMPTIONS:

Disposal Basin -
Length - 280 ft along bottom, 350 ft along top (Ref 3).
Width - 250 ft along bottom, 320 ft along top (Ref 3).
Depth - Basin is 20 ft deep, bottom of basin is 25 ft below grade.
Slopes - 1.75H:1.0V, based on 250 ft bottom width, 320 ft top width.
Disposal trench has been covered with 5 ft of material (Ref 7); cover material is assumed to be uncontaminated.

Contaminated Area -
North, South, East, West - Assume no lateral contamination.
Depth -
Minimum - none.
Probable - Pit material only.
Maximum - same as probable.

Other Materials -
The basins may have been used to dispose of other wastes; assume 25% metals, 75% ash (soft waste).

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 438 ft (Ref 7)
Groundwater - 395 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-1

CONTAINMATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume cy
Ash Pit Material					1.8		
Top dimension	350	320	20			112,000	
Bottom dimension	280	250	20	70,000			66,802
Subtotal - Soils							50,102
Subtotal - Soft Waste							16,701
TOTAL			20				66,802

EXCAVATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume cy
Overburden					1.8		
Top Dimension	367.5	337.5				124031	
Bottom Dimension	350	320	5	112000			21,845
Ash Pit Excavation					1.8		
Top dimension	350	320				112,000	
Bottom dimension	280	250	20	70,000			66,802
TOTAL			25				88,648

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-1

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
25	5	1.5	10	40	50	42.5	4.25	174

Sub-Volume I	134
Sub-Volume II	14
Sub-Volume III	24
Sub-Volume IV	2

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-1

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	25,777 lcy	2000 lcy/shift	12.9	12.9
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	86,843 lcy	1000 lcy/shift	86.8	86.8
Other Clean Material	0 lcy	1000 lcy/shift	0.0	0.0
Ramp	205 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	26,721 tons	100 ton/shift	267.2	267.2
Metals Loading	26,721 tons	900 ton/shift	29.7	29.7
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	112,826 lcy		396.7	396.7

NOTES:

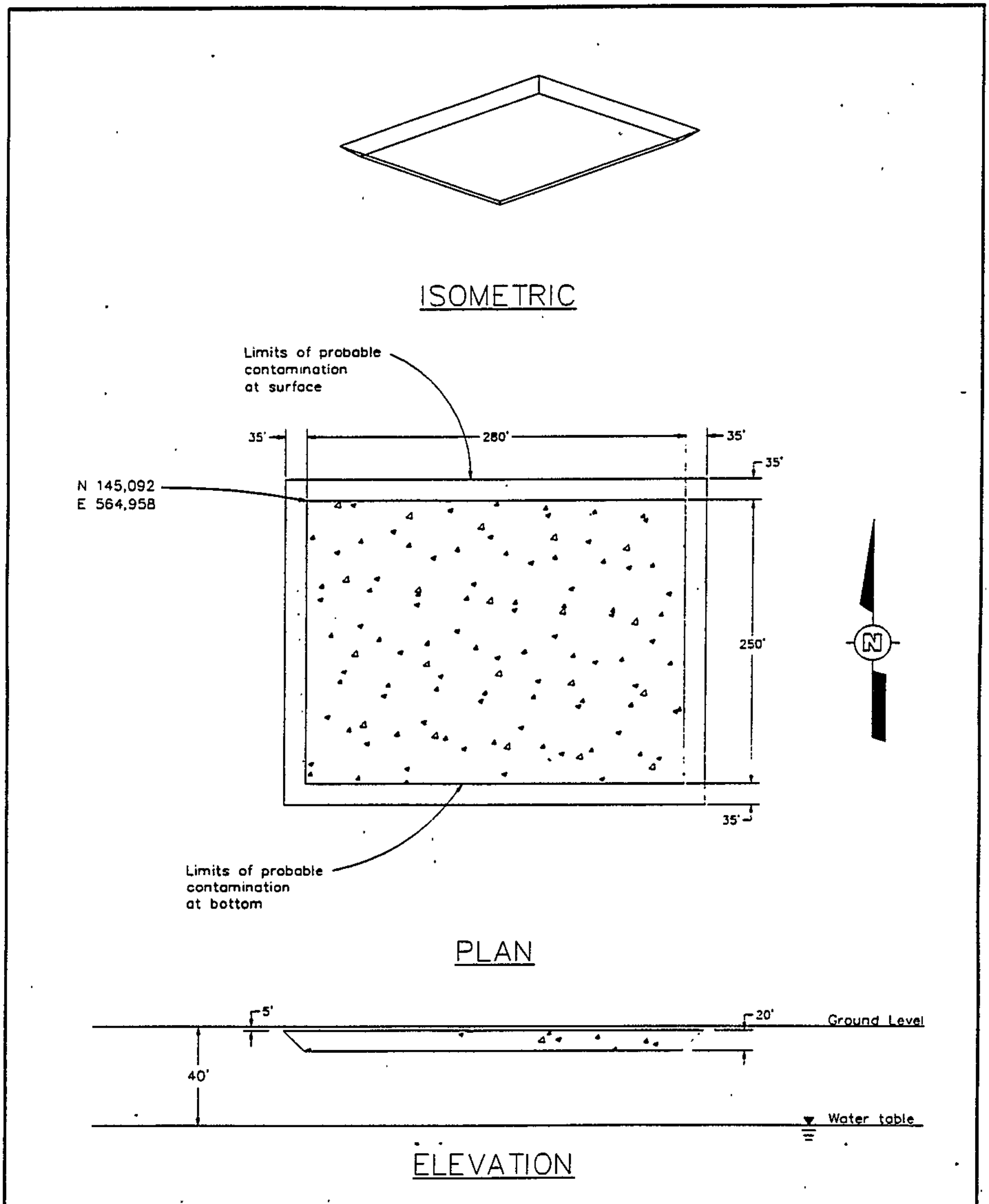
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



SCALE: NONE

WASTE SITE 126-B-

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-3
SITE NAME: 184-B Coal Pit (Demolition & Inert Landfill)

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
Length - 400 ft at base(Ref 1)
Width - 225 ft at base (Ref 1).
Depth - 20 ft depth assumed.
Assume 1.0H:1.0V
Burial ground has been covered with a 1 ft of pit run fill material.

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum, Probable, and Maximum are the same.
Depth - 20 ft depth assumed.

Other Materials -
75% of material is non-metals (soft waste), 25% has not been filled (Ref 1).

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 440 ft (Ref 7)
Groundwater - 397 ft (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-3

CONTAMINATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Material					1.0		
Top dimension	440	265	20			116,600	
Bottom dimension	400	225	20	90,000			76,321
Subtotal Soft Waste							57,241
Subtotal Void							-19,080
TOTAL			20				57,241

EXCAVATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	463	288	1	131,100	1.5	133,344	4,897
Trench Material							
Top dimension	460	285	20		1.5	131,100	
Bottom dimension	400	225	20	90,000	1.5		81,444
Void Volume							-19,080
TOTAL			21				105,422

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-3

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
21	1	1.5	10	40	10	8.5	0.85	6

Sub-Volume I	5
Sub-Volume II	0
Sub-Volume III	1
Sub-Volume IV	0

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 126-B-3

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	5,779 lcy	2000 lcy/shift	2.9	2.9
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	74,413 lcy	1000 lcy/shift	74.4	74.4
Other Clean Material	56,854 lcy	1000 lcy/shift	56.9	56.9
Ramp	8 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	137,053 lcy		134.2	134.2

NOTES:

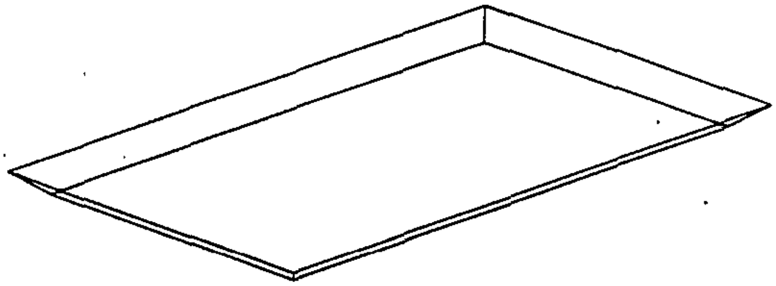
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



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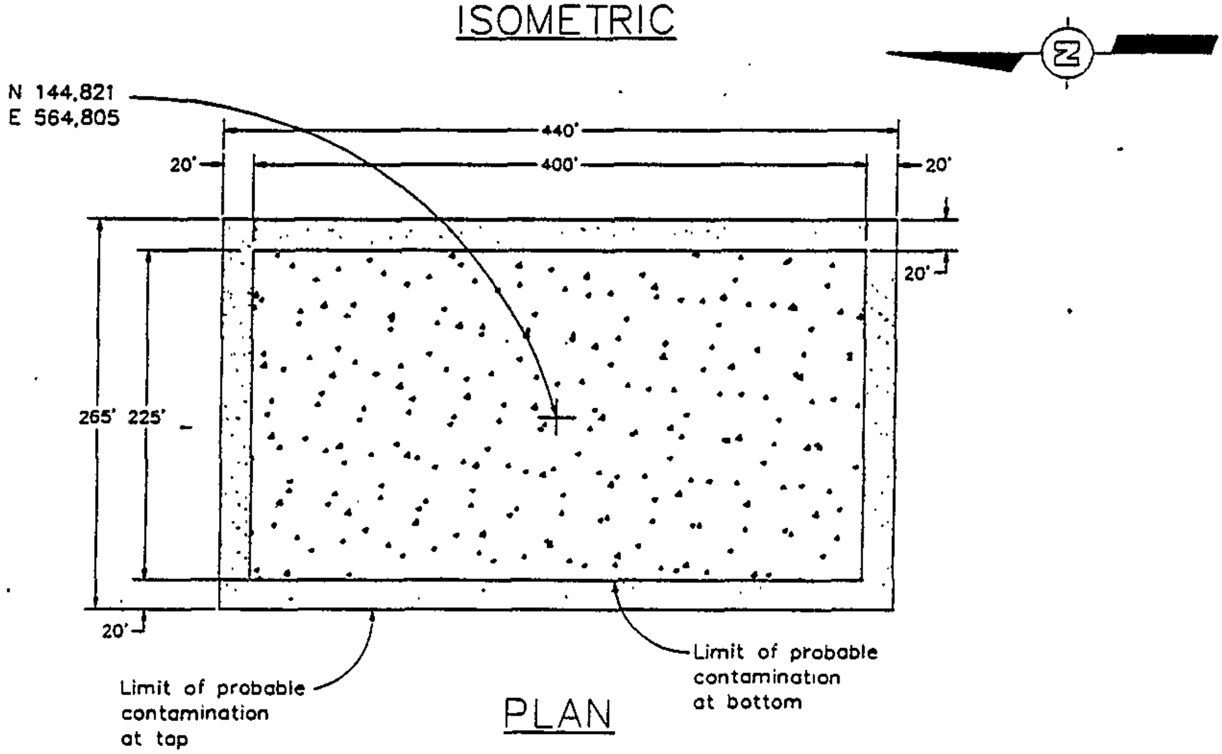
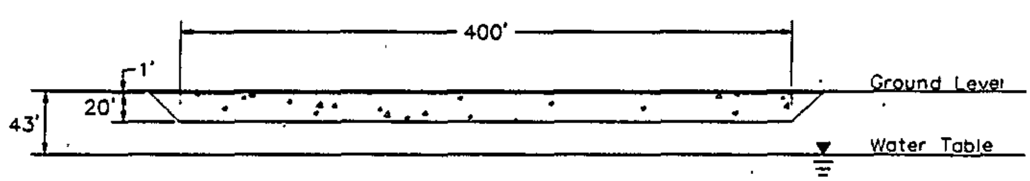


PLAN



ELEVATION

SCALE: NONE

WASTE SITE 126-B-3

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-1
SITE NAME: Burning Pit

CONTAMINATED DIMENSION ASSUMPTIONS:

Burning Pit
Length - 100 ft at base (Ref 1).
Width - 100 ft at base (Ref 1).
Depth - 10 ft deep (Ref 1).
Assume 1.0H/1.0V
Assume 5 ft of fill.

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum - none.
Probable = Maximum - pit material only.

Other Materials -
60% of material is non-metals (soft waste), 40% is soils.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 446 ft (Ref 7).
Groundwater - 392 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5H:1.0V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-1

CONTAMINATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Pit Material					1.00		
Top dimension	120	120	10			14,400	
Bottom dimension	100	100	10	10,000			4,494
Subtotal - Soils							1,798
Subtotal - Soft Waste							2,696
TOTAL			10				4,494

EXCAVATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	145	145	5	16,900	1.5	21,025	3,505
Excavated Material					1.5		
Top dimension	130	130	10			16,900	
Bottom dimension	100	100	10	10,000			4,926
TOTAL			15				8,431

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-1

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
15	5	1.5	10	40	50	42.5	4.25	174

Sub-Volume I	134
Sub-Volume II	14
Sub-Volume III	24
Sub-Volume IV	2

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-1

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	4,135 lcy	2000 lcy/shift	2.1	2.1
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	5,842 lcy	1000 lcy/shift	5.8	5.8
Other Clean Material	510 lcy	1000 lcy/shift	0.5	0.5
Ramp	205 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	10,693 lcy		8.5	8.5

NOTES:

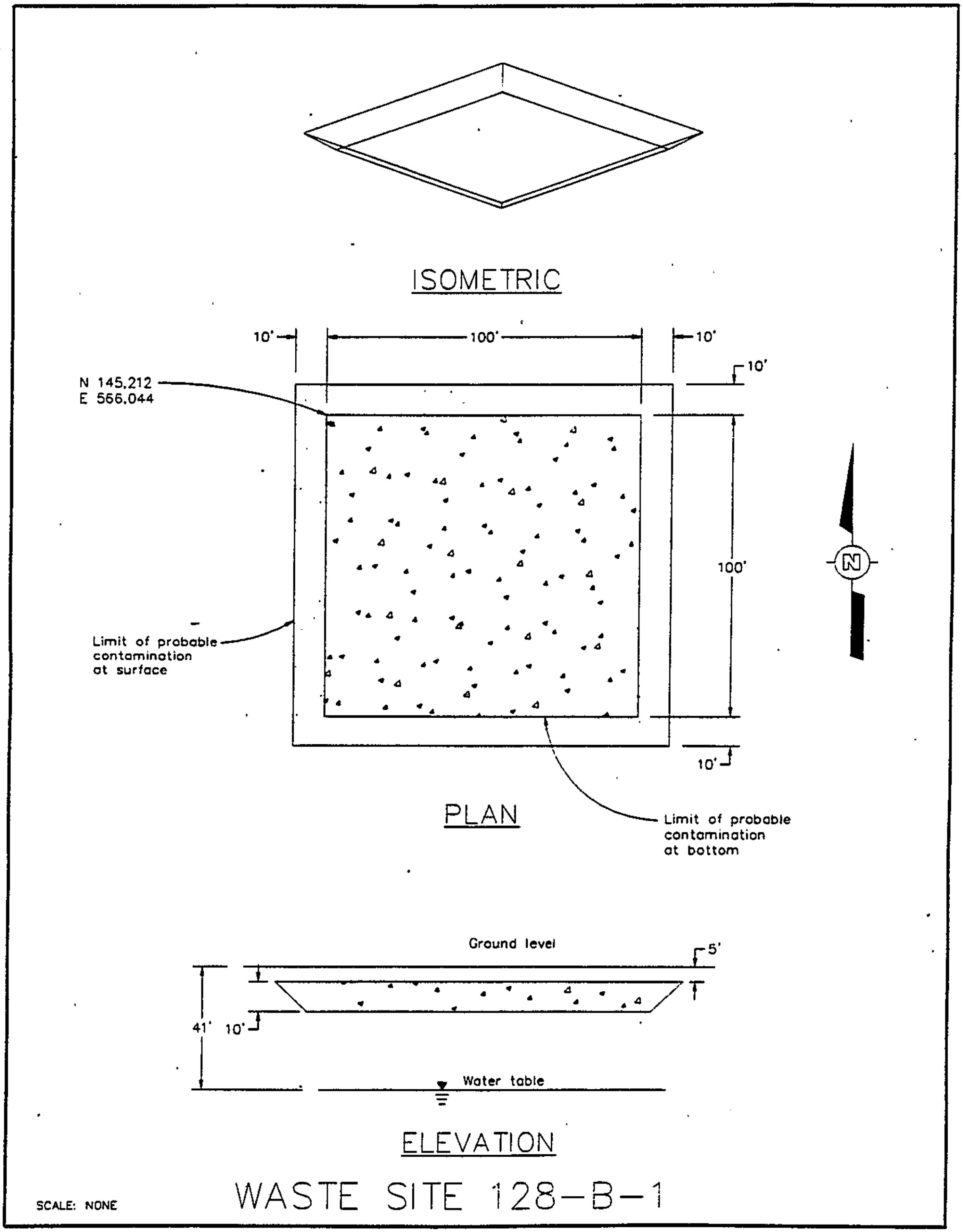
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.


ISOMETRIC
10'
100'
10'
10'
N 145,212
E 566,044
Limit of probable contamination at surface
100'
10'
PLAN
Limit of probable contamination at bottom
Ground level
5'
41'
10'
Water table
ELEVATION
SCALE: NONE
WASTE SITE 128-B-1

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-2
SITE NAME: 100-B Burn Pit

CONTAMINATED DIMENSION ASSUMPTIONS:

Burn Pit
- Length - 450 ft at base (Ref 1).
- Width - 30 ft at base (Ref 1).
- Depth - assume 20 ft deepth.
- Assume 1.0H/1.0V
- Assume 5 ft of fill.

Contaminated Area -
- North, South, East, West - No lateral contamination.
- Minimum - none.
- Probable = Maximum - pit material only.

Other Materials -
- 100 % non metals (soft waste).

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 471 ft (Ref 7).
Groundwater - 397 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5H:1.0V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-2

CONTAMINATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Pit Material					1.00		
Top dimension	490	70	20			34,300	
Bottom dimension	450	30	20	13,500			17,506
Subtotal - Soft Waste							17,506
TOTAL			20				17,506

EXCAVATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	525	105	5	45,900	1.5	55,125	9,347
Excavated Material					1.5		
Top dimension	510	90	20			45,900	
Bottom dimension	450	30	20	13,500			21,556
TOTAL			25				30,903

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-2

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
25	5	1.5	10	40	50	42.5	4.25	174

Sub-Volume I	134
Sub-Volume II	14
Sub-Volume III	24
Sub-Volume IV	2

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-2

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	11,030 lcy	2000 lcy/shift	5.5	5.5
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	22,758 lcy	1000 lcy/shift	22.8	22.8
Other Clean Material	4,778 lcy	1000 lcy/shift	4.8	4.8
Ramp	205 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	38,771 lcy		33.2	33.2

NOTES:

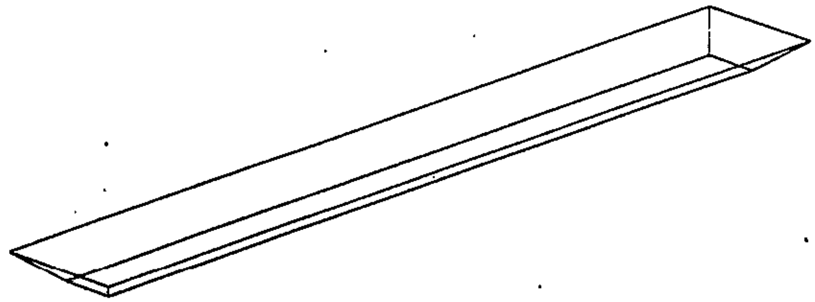
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

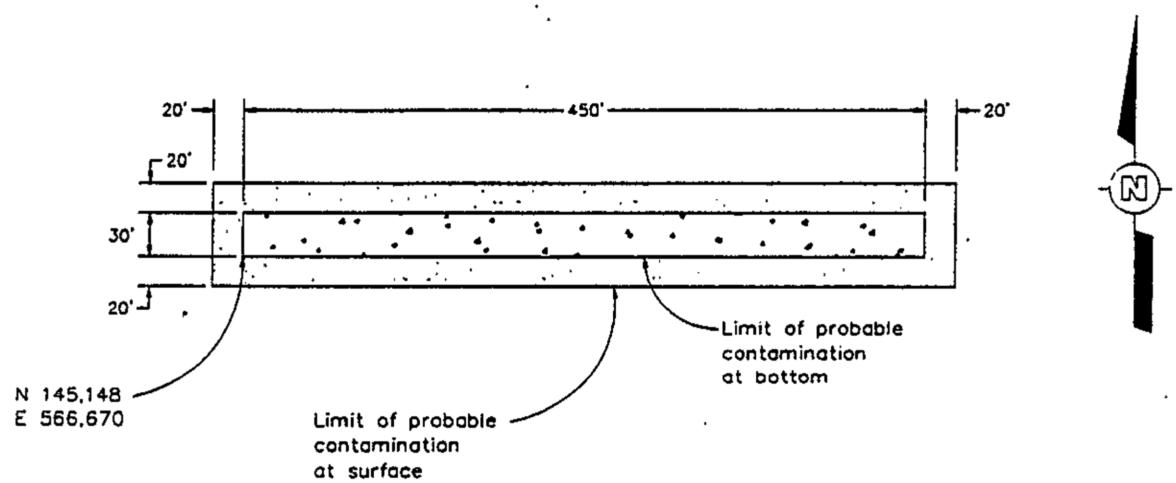
- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

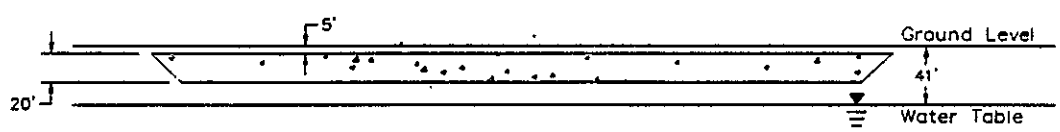
(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



ISOMETRIC



PLAN



ELEVATION

SCALE: NONE

WASTE SITE 128-B-2

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-3
SITE NAME: 100-B Dump Site

CONTAMINATED DIMENSION ASSUMPTIONS:

Dump Site -
Length - 450 ft at base (Ref 1).
Width - 30 ft at base (Ref 1).
Depth - assume 20 ft depth.
Assume 1.0H/1.0V
Assume 5 ft of fill.

Contaminated Area -
North, South, East, West - No lateral contamination.
Minimum - none.
Probable = Maximum - pit material only.

Other Materials -
Dump Site consists of 60% soft wastes, 40% soil.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 446 ft (Ref 7).
Groundwater - 387 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5H:1.0V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-3

CONTAMINATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Pit Material					1.00		
Top dimension	490	100	20			49,000	
Bottom dimension	450	60	20	27,000			27,951
Subtotal - Soils							11,180
Subtotal - Soft Waste							16,770
TOTAL			20				27,951

EXCAVATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	525	135	5	61,200	1.5	70,875	12,222
Excavated Material					1.5		
Top dimension	510	120	20			61,200	
Bottom dimension	450	60	20	27,000			32,222
TOTAL			25				44,444

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-3

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
25	5	1.5	10	40	50	42.5	4.25	174

Sub-Volume I	134
Sub-Volume II	14
Sub-Volume III	24
Sub-Volume IV	2

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 128-B-3

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	14,422 lcy	2000 lcy/shift	7.2	7.2
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	36,336 lcy	1000 lcy/shift	36.3	36.3
Other Clean Material	5,040 lcy	1000 lcy/shift	5.0	5.0
Ramp	205 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	56,004 lcy		48.7	48.7

NOTES:

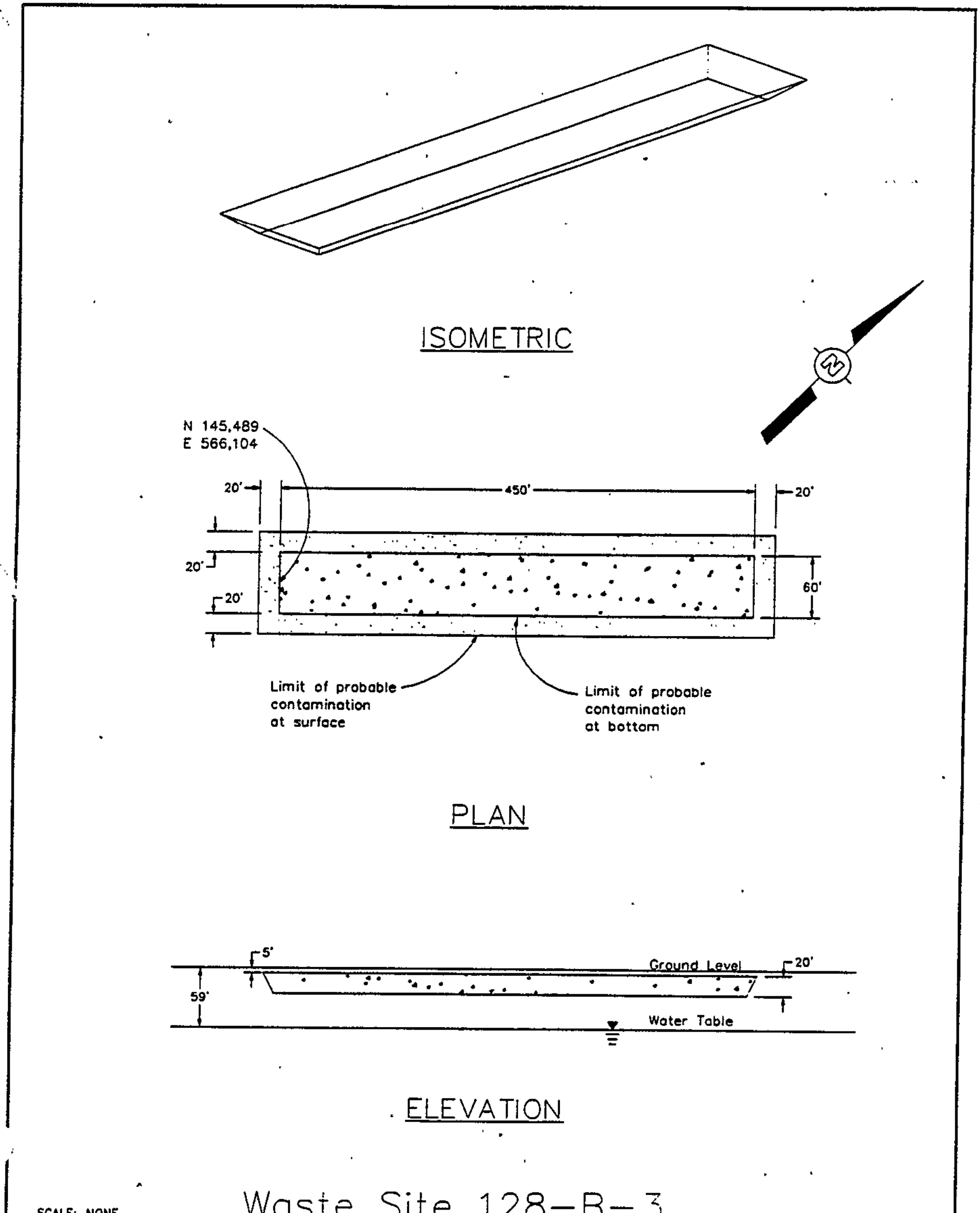
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



Waste Site 128-B-3

Volume Estimate
100 BC Area

SITE NUMBER: 128-C-1
SITE NAME: Burning Pit

CONTAMINATED DIMENSION ASSUMPTIONS:

Burn Pit
- Length - 225 ft at base (Ref 1).
- Width - 125 ft at base (Ref 1).
- Depth - assume 20 ft depth.
- Assume 1.0H/1.0V
- Assume 5 ft of fill.

Contaminated Area -
- North, South, East, West - No lateral contamination.
- Minimum - none.
- Probable = Maximum - pit material only.

Other Materials -
- Assume 50% soil, 25% metal, and 25% non metal.

Attached figure shows site plan and cross section with the limit of probable contamination identified.

ELEVATIONS:

Surface - 489 ft (Ref 7).
Groundwater - 397 ft (Ref 6).

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5H:1.0V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a truncated rectangular pyramid.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 128-C-1

CONTAMINATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Pit Material					1.00		
Top dimension	265	165	20			43,725	
Bottom dimension	225	125	20	28,125			26,414
Subtotal - Soils							13,207
Subtotal - Metal							6,603
Subtotal - Soft Waste							6,603
TOTAL			20				26,414

EXCAVATED VOLUME

PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Depth ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	300	200	5	52,725	1.5	60,000	10,431
Excavated Material					1.5		
Top dimension	285	185	20			52,725	
Bottom dimension	225	125	20	28,125			29,500
TOTAL			25				39,931

Volume Estimate
100 BC Area

SITE NUMBER: 128-C-1

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
25	5	1.5	10	40	50	42.5	4.25	174

Sub-Volume I	134
Sub-Volume II	14
Sub-Volume III	24
Sub-Volume IV	2

NOTES:
See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 128-C-1

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	12,308 lcy	2000 lcy/shift	6.2	6.2
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	34,338 lcy	1000 lcy/shift	34.3	34.3
Other Clean Material	3,642 lcy	1000 lcy/shift	3.6	3.6
Ramp	205 lcy	2000 lcy/shift	0.1	0.1
Misc Material Handling				
Metals Demolition	10,565 tons	100 ton/shift	105.7	105.7
Metals Loading	10,565 tons	900 ton/shift	11.7	11.7
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	50,493 lcy		161.6	161.6

NOTES:

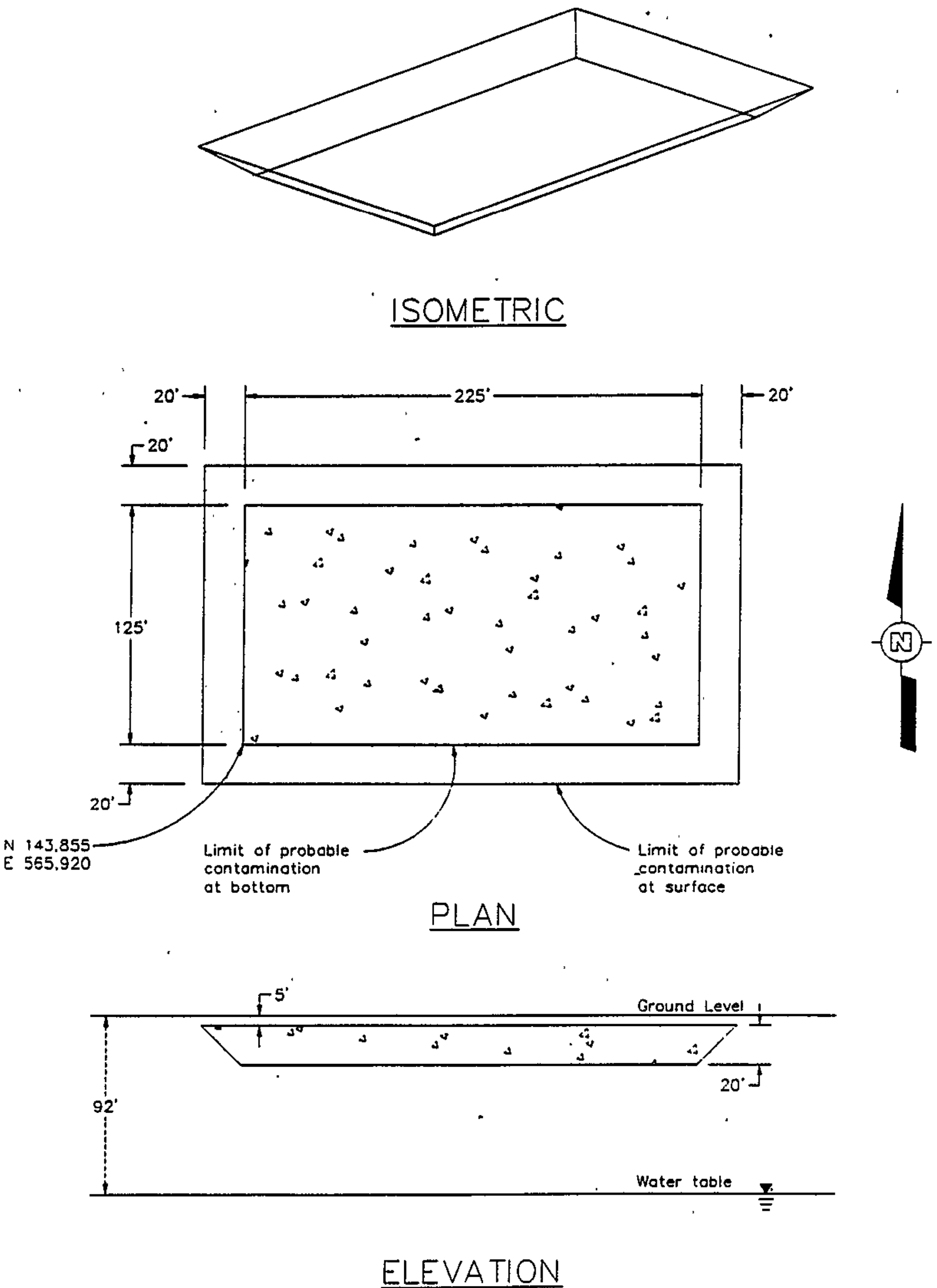
(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.



WASTE SITE 128-C-1

SCALE: NONE

Volume Estimate
100 BC Area

SITE NUMBER: 600-33
SITE NAME: 105-C Reactor Test Loop Burial Site

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
Length - 20 ft at base(Ref 1)
Width - 5 ft at base.
Depth - 15 ft.
Assume 1.0H:1.0V

Contaminated Area -
Consists of the test loop only.
Minimum, Probable, and Maximum are the same.
The test loop is 20 ft long and 2 inches in maximum diameter. It is assumed that the loop was buried intact at a depth of 15 ft.

Other Materials -
100% of material is metal (Ref 1).

ELEVATIONS:

Surface - 151 m (Ref 7)
Groundwater - 121 m (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

Excavation Slopes - 1.5 H : 1.0 V
Ramp volume calculated separately.

VOLUME CALCULATION ASSUMPTIONS:

The shape of the unit is assumed to be that of a cylinder.
The shape of the excavation is assumed to be that of a truncated rectangular pyramid.
Volumes are given in bank cubic yards. Swell factors are applied for production rate and duration estimates (see page 4).

Volume Estimate
100 BC Area

SITE NUMBER: 600-33

CONTAMINATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Outside Diameter in	Thickness in	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Test Loop					1.0		
Outer Tube	20	2.0	0.250	3.33			0.0071
Inner Tube	20	1.5	0.065				0.0011
Subtotal Soft Waste							
Subtotal Metal							0.0082
TOTAL							0.0082

EXCAVATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	65	50	14	184	1.5	3,250	738
Trench Material							
Top dimension	23	8	1		1.5	184	
Bottom dimension	20	5	1	100	1.5		
Subtotal							5
TOTAL			15				743

Volume Estimate
100 BC Area

SITE NUMBER 600-33

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
15	14	1.5	10	40	140	119	11.9	1,598

Sub-Volume I	1,049
Sub-Volume II	309
Sub-Volume III	185
Sub-Volume IV	55

NOTES:

See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 600-33

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	871 lcy	2000 lcy/shift	0.4	0.4
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	0 lcy	1000 lcy/shift	0.0	0.0
Other Clean Material	6 lcy	1000 lcy/shift	0.0	0.0
Ramp	1,885 lcy	2000 lcy/shift	0.9	0.9
Misc Material Handling				
Metals Demolition	0.05 tons	100 ton/shift	0.0	0.0
Metals Loading	0.05 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	2,762 lcy		1.4	1.4

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

Volume Estimate
100 BC Area

SITE NUMBER: 600-34
SITE NAME: Baled Tumbleweed Disposal Site

CONTAMINATED DIMENSION ASSUMPTIONS:

Burial Ground
- Length - 800 ft at base (Ref 1)
- Width - 300 ft at base (Ref 1).
- Depth - 15 ft.
- Assume 1.0H:1.0V

Contaminated Area -
The site contains nuisance noncontaminated tumbleweeds and other disposed of soft materials. No contaminated materials are present.

Other Materials -
100% of material is non-metals (soft waste). (Ref 1).

ELEVATIONS:

Surface - 123 m (Ref 7)
Groundwater - 119 m (Ref 6)

EXCAVATION DIMENSION ASSUMPTIONS:

No excavation.

VOLUME CALCULATION ASSUMPTIONS:

No contaminated or excavated volume.

Volume Estimate
100 BC Area

SITE NUMBER: 600-34

CONTAMINATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Side Slope H/V	Top Area sf	Volume bcy
Trench Material					1.0		
Top dimension	0	0	0			0	
Bottom dimension	0	0	0	0			0
Subtotal Soft Waste							0
Subtotal Metal							0
TOTAL							0

EXCAVATED VOLUME

MINIMUM, PROBABLE, MAXIMUM

Unit	Length ft	Width ft	Thickness ft	Bottom Area sf	Slope H/V	Top Area sf	Volume bcy
Overburden	0	0	0	0	1.5	0	0
Trench Material							
Top dimension	0	0	0		1.5	0	
Bottom dimension	0	0	0	0	1.5		
Subtotal							0
TOTAL			0				0

Volume Estimate
100 BC Area

SITE NUMBER 600-34

RAMP VOLUME

Excavation Depth (ft)	Ramp Depth (ft)	Excavation Slope	Ramp Grade (%)	Ramp Width (ft)	Ramp Length (ft)	Dimen. A (ft)	Dimen. B (ft)	Ramp Volume (bcy)
0	0	1.5	10	40	0	#DIV/0!	#DIV/0!	#DIV/0!

Sub-Volume I	#DIV/0!
Sub-Volume II	#DIV/0!
Sub-Volume III	#DIV/0!
Sub-Volume IV	#DIV/0!

NOTES:

See figure for ramp dimension and sub-volume definitions.

Volume Estimate
100 BC Area

SITE NUMBER: 600-34

EXCAVATED QUANTITIES AND DURATION
PROBABLE VOLUME

Excavation	Quantity (1)	Production Rate (2)	Duration (3) (shifts)	Adj. Duration (4) (shifts)
Overburden	0 lcy	2000 lcy/shift	0.0	0.0
Basin Fill	0 lcy	1500 lcy/shift	0.0	0.0
Contaminated Material	0 lcy	1000 lcy/shift	0.0	0.0
Other Clean Material	0 lcy	1000 lcy/shift	0.0	0.0
Ramp	0 lcy	2000 lcy/shift	0.0	0.0
Misc Material Handling				
Metals Demolition	0 tons	100 ton/shift	0.0	0.0
Metals Loading	0 tons	900 ton/shift	0.0	0.0
Concrete Demolition	0 lcy	200 lcy/shift	0.0	0.0
Concrete Loading	0 lcy	1500 lcy/shift	0.0	0.0
TOTAL	0 lcy		0.0	0.0

NOTES:

(1) - Swell factors applied to convert bank cubic yards (bcy) to loose cubic yards (lcy):

Burial Ground Waste	1.30
Other Metals	1.30
Concrete	1.60
Soil	1.18

- Metal Density applied to convert metal volume (bcy) to weight (tons), conversion factors (tons/bcy):

Burial Ground Metals	1.60
Other Metals	6.60

(2) Production rates, see section 4.4.2.
(3) 1 shift = 7 x 45 minute hours.
(4) Total Duration: not less than 1 shift.

100 B/C Cost Estimate Introduction

The 100 B/C LSR material handling cost estimate is prepared using the MCACES cost estimating software. The estimate is broken down by fiscal year then by operating group followed by capital cost, expense, and operations and maintenance. The first section of the estimate is a summary of costs by fiscal year and the second section contains the details of the estimate. The following assumptions are used in preparation of the estimate:

- The cost estimate is prepared using the MCACES cost estimating software.
- The analytical system equipment, field and laboratory personnel, and operating costs are not included in the estimate. The following elements are included:
    - The framework for the classification structure.
    - The operating crew for the classification structure.
    - The sample transport vehicle and driver.
- Waste disposal to the ERDF is not included in the estimate.
- The project is approached as a contract, and as such operating personnel will be paid only for the days which they are on the job.
- Written cost quotations are obtained for all major pieces of equipment. Where vendor quotes are not used, the cost data are obtained from the MCACES database.
- All mobile equipment (excavation equipment and haul trucks) are procured on a lease to own basis such that payments are distributed over the years that the equipment is required. Cost of money is 8.1 % (annual percentage rate).
- Existing WHC services are used where available (see Section 6.6.2 of report).
- All costs are reported in third quarter 1993 dollars.
- No escalation or contingency factors are added.
- Operating crews are paid for 50 days which no work is performed due to weather.
- Weather down days occur in January, February March, July, August, and September. Crews scheduled to work during these months experience the weather down-days.
- Operating crews are paid for 20 days in the first year which no work is performed due to learning curve inefficiencies.

- Davis Bacon wage rates are assumed for contractors and Westinghouse Hanford fiscal year 1993 average labor rates are assumed for work performed by WHC.

- Production based crews (excavation and trucking) are paid for 200 operating days per year plus 50 non-productive days due to weather.

- Non-production based crews (such as survey station, classification structure, container handling) are paid for 250 operating days per year.

- Equipment operating costs are paid only for hours of operation which is 5.25 hrs per shift, 200 days per year for production based crews and 250 days for non-production based crews.

- The cost of diesel is $0.82 per gallon.

- The cost of gasoline is $1.22 per gallon.

- All on-site workers are required to take 40 hr hazardous waste and 40 hr radiological worker training along with the yearly 8 hr refreshers.

- Equipment mobilization costs include any costs to erect the equipment and a 7.8% state sales tax.

- Work done by subcontractors will be marked up with 12% overhead and 8% profit.

- Work done by the prime contractor will be marked up with 25.5% G&A and CSP and 7.3% MPR.

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

100 B/C LSR SUMMARY PAGE 1

** PROJECT INDIRECT SUMMARY - LEVEL 1 **

	QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
01 FY 1996	1.00	EA	18,055,843	0	0	18,055,843	18055843
02 FY 1997	1.00	EA	14,446,861	0	0	14,446,861	14446861
03 FY 1998	1.00	EA	27,343,534	0	0	27,343,534	27343534
04 FY 1999	1.00	EA	28,795,955	0	0	28,795,955	28795955
05 FY 2000	1.00	EA	30,025,398	0	0	30,025,398	30025398
06 FY 2001	1.00	EA	25,921,045	0	0	25,921,045	25921045
100 B/C AREA REMEDIAL ACTIVITIES	1.00	EA	144,588,635	0	0	144,588,635	144588635

LABOR ID: NAT92A. EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

100 B/C LSR SUMMARY PAGE 2

** PROJECT INDIRECT SUMMARY - LEVEL 2 **

		QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
01	FY 1996							
01.01	PRE-CONSTRUCTION	1.00	EA	4,612,131	0	0	4,612,131	4612131
01.02	EXCAVATION/DEMOLITION	1.00	EA	1,877,499	0	0	1,877,499	1877499
01.03	TRANSPORTATION	1.00	EA	7,821,687	0	0	7,821,687	7821687
01.04	ANCILLARY	1.00	EA	2,314,732	0	0	2,314,732	2314732
01.05	SUPPORT	1.00	EA	1,429,794	0	0	1,429,794	1429794
	FY 1996	1.00	EA	18,055,843	0	0	18,055,843	18055843
02	FY 1997							
02.01	PRE-CONSTRUCTION	1.00	EA	71,940	0	0	71,940	71940.00
02.02	EXCAVATION/DEMOLITION	1.00	EA	2,626,881	0	0	2,626,881	2626881
02.03	TRANSPORTATION	1.00	EA	6,463,213	0	0	6,463,213	6463213
02.04	ANCILLARY	1.00	EA	1,555,904	0	0	1,555,904	1555904
02.05	SUPPORT	1.00	EA	3,728,924	0	0	3,728,924	3728924
	FY 1997	1.00	EA	14,446,861	0	0	14,446,861	14446861
03	FY 1998							
03.01	PRE-CONSTRUCTION	1.00	EA	71,940	0	0	71,940	71940.00
03.02	EXCAVATION/DEMOLITION	1.00	EA	7,329,531	0	0	7,329,531	7329531
03.03	TRANSPORTATION	1.00	EA	10,210,826	0	0	10,210,826	10210826
03.04	ANCILLARY	1.00	EA	2,436,357	0	0	2,436,357	2436357
03.05	SUPPORT	1.00	EA	6,075,256	0	0	6,075,256	6075256
03.06	RECLAMATION	1.00	EA	1,219,625	0	0	1,219,625	1219625
	FY 1998	1.00	EA	27,343,534	0	0	27,343,534	27343534
04	FY 1999							
04.01	PRE-CONSTRUCTION	1.00	EA	71,940	0	0	71,940	71940.00
04.02	EXCAVATION/DEMOLITION	1.00	EA	7,584,242	0	0	7,584,242	7584242
04.03	TRANSPORTATION	1.00	EA	11,784,111	0	0	11,784,111	11784111
04.04	ANCILLARY	1.00	EA	2,436,357	0	0	2,436,357	2436357
04.05	SUPPORT	1.00	EA	6,075,256	0	0	6,075,256	6075256
04.06	RECLAMATION	1.00	EA	844,050	0	0	844,050	844049.78
	FY 1999	1.00	EA	28,795,955	0	0	28,795,955	28795955
05	FY 2000							
05.01	PRE-CONSTRUCTION	1.00	EA	71,940	0	0	71,940	71940.00
05.02	EXCAVATION/DEMOLITION	1.00	EA	7,271,833	0	0	7,271,833	7271833
05.03	TRANSPORTATION	1.00	EA	11,834,658	0	0	11,834,658	11834658

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

** PROJECT INDIRECT SUMMARY - LEVEL 2 **

		QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
05.04	ANCILLARY	1.00 EA	2,436,357	0	0	2,436,357	2436357
05.05	SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
05.06	RECLAMATIOR	1.00 EA	2,335,354	0	0	2,335,354	2335354
	FY 2000	1.00 EA	30,025,398	0	0	30,025,398	30025398
06	FY 2001						
06.01	PRE-CONSTRUCTION	1.00 EA	71,940	0	0	71,940	71940.00
06.02	EXCAVATION/DEMOLITION	1.00 EA	5,181,284	0	0	5,181,284	5181284
06.03	TRANSPORTATION	1.00 EA	8,386,350	0	0	8,386,350	8386350
06.04	ANCILLARY	1.00 EA	1,626,992	0	0	1,626,992	1626992
06.05	SUPPORT	1.00 EA	5,757,462	0	0	5,757,462	5757462
06.06	RECLAMATION	1.00 EA	4,897,017	0	0	4,897,017	4897017
	FY 2001	1.00 EA	25,921,045	0	0	25,921,045	25921045
	100 B/C AREA REMEDIAL ACTIVITIES	1.00 EA	144,588,635	0	0	144,588,635	144588635

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

100 B/C LSR SUMMARY PAGE 4

** PROJECT INDIRECT SUMMARY - LEVEL 3 **

	QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
01 FY 1996							
01.01 PRE-CONSTRUCTION							
01.01.02 TRAINING	1.00	EA	925,729	0	0	925,729	925729.23
01.01.03 SITE PREPARATION	1.00	EA	878,648	0	0	878,648	878648.28
01.01.04 SITE MOBILIZATION	1.00	EA	2,807,753	0	0	2,807,753	2807753
PRE-CONSTRUCTION	1.00	EA	4,612,131	0	0	4,612,131	4612131
01.02 EXCAVATION/DEMOLITION							
01.02.01 EXCAVATION/DEMOLITION	1.00	EA	1,877,499	0	0	1,877,499	1877499
EXCAVATION/DEMOLITION	1.00	EA	1,877,499	0	0	1,877,499	1877499
01.03 TRANSPORTATION							
01.03.01 RAIL	1.00	EA	2,398,401	0	0	2,398,401	2398401
01.03.02 ROAD	1.00	EA	3,886,670	0	0	3,886,670	3886670
01.03.03 CONTAINERS	1.00	EA	1,536,616	0	0	1,536,616	1536616
TRANSPORTATION	1.00	EA	7,821,687	0	0	7,821,687	7821687
01.04 ANCILLARY							
01.04.01 EQUIPMENT DECON FACILITY	1.00	EA	960,619	0	0	960,619	960619.17
01.04.03 OFFICE AREA	1.00	EA	633,286	0	0	633,286	633286.10
01.04.04 PERSONNEL DECONTAMINATION	1.00	EA	246,382	0	0	246,382	246382.07
01.04.06 UTILITIES	1.00	EA	474,444	0	0	474,444	474444.29
ANCILLARY	1.00	EA	2,314,732	0	0	2,314,732	2314732
01.05 SUPPORT							
01.05.01 SUPPORT	1.00	EA	1,429,794	0	0	1,429,794	1429794
SUPPORT	1.00	EA	1,429,794	0	0	1,429,794	1429794
01.06 RECLAMATION							
FY 1996	1.00	EA	18,055,843	0	0	18,055,843	18055843
02 FY 1997							

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
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** PROJECT INDIRECT SUMMARY - LEVEL 3 **

	QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
02.01 PRE-CONSTRUCTION							
02.01.02 TRAINING	1.00	EA	71,940	0	0	71,940	71940.00
PRE-CONSTRUCTION	1.00	EA	71,940	0	0	71,940	71940.00
02.02 EXCAVATION/DEMOLITION							
02.02.01 EXCAVATION/DEMOLITION	1.00	EA	2,626,881	0	0	2,626,881	2626881
EXCAVATION/DEMOLITION	1.00	EA	2,626,881	0	0	2,626,881	2626881
02.03 TRANSPORTATION							
02.03.01 RAIL	1.00	EA	2,310,921	0	0	2,310,921	2310921
02.03.02 ROAD	1.00	EA	3,097,464	0	0	3,097,464	3097464
02.03.03 CONTAINERS	1.00	EA	1,054,828	0	0	1,054,828	1054828
TRANSPORTATION	1.00	EA	6,463,213	0	0	6,463,213	6463213
02.04 ANCILLARY							
02.04.01 EQUIPMENT DECON FACILITY	1.00	EA	122,568	0	0	122,568	122568.34
02.04.02 SURVEY STATION	1.00	EA	809,365	0	0	809,365	809365.17
02.04.03 OFFICE AREA	1.00	EA	565,914	0	0	565,914	565914.08
02.04.04 PERSONNEL DECON/CHANGE AREA	1.00	EA	56,056	0	0	56,056	56056.00
02.04.06 UTILITIES	1.00	EA	2,000	0	0	2,000	2000.00
ANCILLARY	1.00	EA	1,555,904	0	0	1,555,904	1555904
02.05 SUPPORT							
02.05.01 SUPPORT	1.00	EA	3,728,924	0	0	3,728,924	3728924
SUPPORT	1.00	EA	3,728,924	0	0	3,728,924	3728924
02.06 RECLAMATION							
FY 1997	1.00	EA	14,446,861	0	0	14,446,861	14446861
03 FY 1998							

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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** PROJECT INDIRECT SUMMARY - LEVEL 3 **

	QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
03.01 PRE-CONSTRUCTION						
03.01.02 TRAINING	1.00 EA	71,940	0	0	71,940	71940.00
PRE-CONSTRUCTION	1.00 EA	71,940	0	0	71,940	71940.00
03.02 EXCAVATION/DEMOLITION						
03.02.01 EXCAVATION/DEMOLITION	1.00 EA	7,329,531	0	0	7,329,531	7329531
EXCAVATION/DEMOLITION	1.00 EA	7,329,531	0	0	7,329,531	7329531
03.03 TRANSPORTATION						
03.03.01 RAIL	1.00 EA	2,762,926	0	0	2,762,926	2762926
03.03.02 ROAD	1.00 EA	5,619,379	0	0	5,619,379	5619379
03.03.03 CONTAINERS	1.00 EA	1,828,521	0	0	1,828,521	1828521
TRANSPORTATION	1.00 EA	10,210,826	0	0	10,210,826	10210826
03.04 ANCILLARY						
03.04.01 EQUIPMENT DECON FACILITY	1.00 EA	193,657	0	0	193,657	193656.69
03.04.02 SURVEY STATION	1.00 EA	1,618,730	0	0	1,618,730	1618730
03.04.03 OFFICE AREA	1.00 EA	565,914	0	0	565,914	565914.08
03.04.04 PERSONNEL DECON/CHANGE AREA	1.00 EA	56,056	0	0	56,056	56056.00
03.04.06 UTILITIES	1.00 EA	2,000	0	0	2,000	2000.00
ANCILLARY	1.00 EA	2,436,357	0	0	2,436,357	2436357
03.05 SUPPORT						
03.05.01 SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
03.06 RECLAMATION						
03.06.01 RECONTOUR/BACKFILL	1.00 EA	1,219,625	0	0	1,219,625	1219625
RECLAMATION	1.00 EA	1,219,625	0	0	1,219,625	1219625
FY 1998	1.00 EA	27,343,534	0	0	27,343,534	27343534

04 FY 1999

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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** PROJECT INDIRECT SUMMARY - LEVEL 3 **

	QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
04.01 PRE-CONSTRUCTION							
04.01.02 TRAINING	1.00	EA	71,940	0	0	71,940	71940.00
PRE-CONSTRUCTION	1.00	EA	71,940	0	0	71,940	71940.00
04.02 EXCAVATION/DEMOLITION							
04.02.01 EXCAVATION/DEMOLITION	1.00	EA	7,584,242	0	0	7,584,242	7584242
EXCAVATION/DEMOLITION	1.00	EA	7,584,242	0	0	7,584,242	7584242
04.03 TRANSPORTATION							
04.03.01 RAIL	1.00	EA	2,762,926	0	0	2,762,926	2762926
04.03.02 ROAD	1.00	EA	7,192,664	0	0	7,192,664	7192664
04.03.03 CONTAINERS	1.00	EA	1,828,521	0	0	1,828,521	1828521
TRANSPORTATION	1.00	EA	11,784,111	0	0	11,784,111	11784111
04.04 ANCILLARY							
04.04.01 EQUIPMENT DECON FACILITY	1.00	EA	193,657	0	0	193,657	193656.69
04.04.02 SURVEY STATION	1.00	EA	1,618,730	0	0	1,618,730	1618730
04.04.03 OFFICE AREA	1.00	EA	565,914	0	0	565,914	565914.08
04.04.04 PERSONNEL DECON/CHANGE AREA	1.00	EA	56,056	0	0	56,056	56056.00
04.04.06 UTILITIES	1.00	EA	2,000	0	0	2,000	2000.00
ANCILLARY	1.00	EA	2,436,357	0	0	2,436,357	2436357
04.05 SUPPORT							
04.05.01 SUPPORT	1.00	EA	6,075,256	0	0	6,075,256	6075256
SUPPORT	1.00	EA	6,075,256	0	0	6,075,256	6075256
04.06 RECLAMATION							
04.06.01 RECONTOUR/BACKFILL	1.00	EA	844,050	0	0	844,050	844049.78
RECLAMATION	1.00	EA	844,050	0	0	844,050	844049.78
FY 1999	1.00	EA	28,795,955	0	0	28,795,955	28795955
05 FY 2000							

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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** PROJECT INDIRECT SUMMARY - LEVEL 3 **

	QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
05.01 PRE-CONSTRUCTION						
05.01.02 TRAINING	1.00 EA	71,940	0	0	71,940	71940.00
PRE-CONSTRUCTION	1.00 EA	71,940	0	0	71,940	71940.00
05.02 EXCAVATION/DEMOLITION						
05.02.01 EXCAVATION/DEMOLITION	1.00 EA	7,271,833	0	0	7,271,833	7271833
EXCAVATION/DEMOLITION	1.00 EA	7,271,833	0	0	7,271,833	7271833
05.03 TRANSPORTATION						
05.03.01 RAIL	1.00 EA	2,762,926	0	0	2,762,926	2762926
05.03.02 ROAD	1.00 EA	7,243,211	0	0	7,243,211	7243211
05.03.03 CONTAINERS	1.00 EA	1,828,521	0	0	1,828,521	1828521
TRANSPORTATION	1.00 EA	11,834,658	0	0	11,834,658	11834658
05.04 ANCILLARY						
05.04.01 EQUIPMENT DECON FACILITY	1.00 EA	193,657	0	0	193,657	193656.69
05.04.02 SURVEY STATION	1.00 EA	1,618,730	0	0	1,618,730	1618730
05.04.03 OFFICE AREA	1.00 EA	565,914	0	0	565,914	565914.08
05.04.04 PERSONNEL DECON/CHANGE AREA	1.00 EA	56,056	0	0	56,056	56056.00
05.04.06 UTILITIES	1.00 EA	2,000	0	0	2,000	2000.00
ANCILLARY	1.00 EA	2,436,357	0	0	2,436,357	2436357
05.05 SUPPORT						
05.05.01 SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
05.06 RECLAMATION						
05.06.01 RECONTOUR/BACKFILL	1.00 EA	2,335,354	0	0	2,335,354	2335354
RECLAMATION	1.00 EA	2,335,354	0	0	2,335,354	2335354
FY 2000	1.00 EA	30,025,398	0	0	30,025,398	30025398

06 FY 2001

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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** PROJECT INDIRECT SUMMARY - LEVEL 3 **

	QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
06.01 PRE-CONSTRUCTION						
06.01.02 TRAINING	1.00 EA	71,940	0	0	71,940	71940.00
PRE-CONSTRUCTION	1.00 EA	71,940	0	0	71,940	71940.00
06.02 EXCAVATION/DEMOLITION						
06.02.01 EXCAVATION/DEMOLITION	1.00 EA	5,181,284	0	0	5,181,284	5181284
EXCAVATION/DEMOLITION	1.00 EA	5,181,284	0	0	5,181,284	5181284
06.03 TRANSPORTATION						
06.03.01 RAIL	1.00 EA	2,676,440	0	0	2,676,440	2676440
06.03.02 ROAD	1.00 EA	4,167,467	0	0	4,167,467	4167467
06.03.03 CONTAINERS	1.00 EA	1,542,443	0	0	1,542,443	1542443
TRANSPORTATION	1.00 EA	8,386,350	0	0	8,386,350	8386350
06.04 ANCILLARY						
06.04.01 EQUIPMENT DECON FACILITY	1.00 EA	193,657	0	0	193,657	193656.69
06.04.02 SURVEY STATION	1.00 EA	809,365	0	0	809,365	809365.17
06.04.03 OFFICE AREA	1.00 EA	565,914	0	0	565,914	565914.08
06.04.04 PERSONNEL DECON/CHANGE AREA	1.00 EA	56,056	0	0	56,056	56056.00
06.04.06 UTILITIES	1.00 EA	2,000	0	0	2,000	2000.00
ANCILLARY	1.00 EA	1,626,992	0	0	1,626,992	1626992
06.05 SUPPORT						
06.05.01 SUPPORT	1.00 EA	5,757,462	0	0	5,757,462	5757462
SUPPORT	1.00 EA	5,757,462	0	0	5,757,462	5757462
06.06 RECLAMATION						
06.06.01 RECONTOUR/BACKFILL	1.00 EA	3,200,586	0	0	3,200,586	3200586
06.06.02 REVEGETATION	1.00 EA	258,133	0	0	258,133	258133.00
06.06.03 DEMOBILIZATION	1.00 EA	1,438,298	0	0	1,438,298	1438298
RECLAMATION	1.00 EA	4,897,017	0	0	4,897,017	4897017
FY 2001	1.00 EA	25,921,045	0	0	25,921,045	25921045

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
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** PROJECT INDIRECT SUMMARY - LEVEL 3 **

	QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
100 B/C AREA REMEDIAL ACTIVITIES	1.00	EA	144,588,635	0	0	144,588,635	144588635

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

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** PROJECT INDIRECT SUMMARY - LEVEL 4 **

	QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
01 FY 1996							
01.01 PRE-CONSTRUCTION							
01.01.01 PROCUREMENT							
01.01.02 TRAINING							
01.01.02.01 CAPITAL COSTS	1.00	EA	925,729	0	0	925,729	925729.23
TRAINING	1.00	EA	925,729	0	0	925,729	925729.23
01.01.03 SITE PREPARATION							
01.01.03.01 CAPITAL COSTS	1.00	EA	534,911	0	0	534,911	534910.63
01.01.03.02 EXPENSES	1.00	EA	343,738	0	0	343,738	343737.64
SITE PREPARATION	1.00	EA	878,648	0	0	878,648	878648.28
01.01.04 SITE MOBILIZATION							
01.01.04.01 CAPITAL COSTS	1.00	EA	2,807,753	0	0	2,807,753	2807753
SITE MOBILIZATION	1.00	EA	2,807,753	0	0	2,807,753	2807753
PRE-CONSTRUCTION	1.00	EA	4,612,131	0	0	4,612,131	4612131
01.02 EXCAVATION/DEMOLITION							
01.02.01 EXCAVATION/DEMOLITION							
01.02.01.01 CAPITAL COSTS	1.00	EA	1,877,499	0	0	1,877,499	1877499
EXCAVATION/DEMOLITION	1.00	EA	1,877,499	0	0	1,877,499	1877499
EXCAVATION/DEMOLITION	1.00	EA	1,877,499	0	0	1,877,499	1877499
01.03 TRANSPORTATION							
01.03.01 RAIL							
01.03.01.01 CAPITAL COSTS	1.00	EA	2,398,401	0	0	2,398,401	2398401
RAIL	1.00	EA	2,398,401	0	0	2,398,401	2398401

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

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** PROJECT INDIRECT SUMMARY - LEVEL 4 **

		QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
01.03.02	ROAD						
01.03.02.01	CAPITAL COSTS	1.00 EA	3,886,670	0	0	3,886,670	3886670
	ROAD	1.00 EA	3,886,670	0	0	3,886,670	3886670
01.03.03	CONTAINERS						
01.03.03.01	CAPITAL COSTS	1.00 EA	1,536,616	0	0	1,536,616	1536616
	CONTAINERS	1.00 EA	1,536,616	0	0	1,536,616	1536616
	TRANSPORTATION	1.00 EA	7,821,687	0	0	7,821,687	7821687
01.04	ANCILLARY						
01.04.01	EQUIPMENT DECON FACILITY						
01.04.01.01	CAPITAL COSTS	1.00 EA	960,619	0	0	960,619	960619.17
	EQUIPMENT DECON FACILITY	1.00 EA	960,619	0	0	960,619	960619.17
01.04.02	SURVEY STATION						
01.04.03	OFFICE AREA						
01.04.03.01	CAPITAL COSTS	1.00 EA	633,286	0	0	633,286	633286.10
	OFFICE AREA	1.00 EA	633,286	0	0	633,286	633286.10
01.04.04	PERSONNEL DECONTAMINATION						
01.04.04.01	CAPITAL COSTS	1.00 EA	246,382	0	0	246,382	246382.07
	PERSONNEL DECONTAMINATION	1.00 EA	246,382	0	0	246,382	246382.07
01.04.05	RECEIVING AREA/WAREHOUSE						
01.04.06	UTILITIES						
01.04.06.01	CAPITAL COSTS	1.00 EA	472,444	0	0	472,444	472444.29
01.04.06.02	EXPENSES	1.00 EA	2,000	0	0	2,000	2000.00
	UTILITIES	1.00 EA	474,444	0	0	474,444	474444.29
	ANCILLARY	1.00 EA	2,314,732	0	0	2,314,732	2314732

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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** PROJECT INDIRECT SUMMARY - LEVEL 4 **

	QUANTITY	UOM	DIRECT	MPR	G&A+ CSP.	TOTAL COST	UNIT COST
01.05 SUPPORT							
01.05.01 SUPPORT							
01.05.01.01 CAPITAL COSTS	1.00	EA	1,295,443	0	0	1,295,443	1295443
01.05.01.02 EXPENSES	1.00	EA	110,645	0	0	110,645	110644.71
01.05.01.03 OPERATIONS AND MAINTENANCE	1.00	EA	23,706	0	0	23,706	23706.21
SUPPORT	1.00	EA	1,429,794	0	0	1,429,794	1429794
SUPPORT	1.00	EA	1,429,794	0	0	1,429,794	1429794
01.06 RECLAMATION							
01.06.01 RECONTOUR/BACKFILL							
01.06.02 REVEGETATION							
01.06.03 DEMOBILIZATION							
FY 1996	1.00	EA	18,055,843	0	0	18,055,843	18055843
02 FY 1997							
02.01 PRE-CONSTRUCTION							
02.01.01 PROCUREMENT							
02.01.02 TRAINING							
02.01.02.01 CAPITAL COSTS	1.00	EA	71,940	0	0	71,940	71940.00
TRAINING	1.00	EA	71,940	0	0	71,940	71940.00
02.01.03 SITE PREPARATION							
02.01.04 SITE MOBILIZATION							
PRE-CONSTRUCTION	1.00	EA	71,940	0	0	71,940	71940.00
02.02 EXCAVATION/DEMOLITION							
02.02.01 EXCAVATION/DEMOLITION							

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

		QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
02.02.01.01	CAPITAL COSTS	1.00	EA	1,284,591	0	0	1,284,591	1284591
02.02.01.03	OPERATIONS AND MAINTENANCE	1.00	EA	1,342,290	0	0	1,342,290	1342290
	EXCAVATION/DEMOLITION	1.00	EA	2,626,881	0	0	2,626,881	2626881
	EXCAVATION/DEMOLITION	1.00	EA	2,626,881	0	0	2,626,881	2626881
02.03	TRANSPORTATION							
02.03.01	RAIL							
02.03.01.01	CAPITAL COSTS	1.00	EA	518,916	0	0	518,916	518916.15
02.03.01.03	OPERATIONS AND MAINTENANCE	1.00	EA	1,792,005	0	0	1,792,005	1792005
	RAIL	1.00	EA	2,310,921	0	0	2,310,921	2310921
02.03.02	ROAD							
02.03.02.01	CAPITAL COSTS	1.00	EA	1,890,914	0	0	1,890,914	1890914
02.03.02.03	OPERATIONS AND MAINTENANCE	1.00	EA	1,206,551	0	0	1,206,551	1206551
	ROAD	1.00	EA	3,097,464	0	0	3,097,464	3097464
02.03.03	CONTAINERS							
02.03.03.01	CAPITAL COSTS	1.00	EA	281,134	0	0	281,134	281134.11
02.03.03.03	OPERATIONS AND MAINTENANCE	1.00	EA	773,694	0	0	773,694	773693.58
	CONTAINERS	1.00	EA	1,054,828	0	0	1,054,828	1054828
	TRANSPORTATION	1.00	EA	6,463,213	0	0	6,463,213	6463213
02.04	ANCILLARY							
02.04.01	EQUIPMENT DECON FACILITY							
02.04.01.03	OPERATIONS AND MAINTENANCE	1.00	EA	122,568	0	0	122,568	122568.34
	EQUIPMENT DECON FACILITY	1.00	EA	122,568	0	0	122,568	122568.34
02.04.02	SURVEY STATION							
02.04.02.03	OPERATIONS AND MAINTENANCE	1.00	EA	809,365	0	0	809,365	809365.17
	SURVEY STATION	1.00	EA	809,365	0	0	809,365	809365.17

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** PROJECT INDIRECT SUMMARY - LEVEL 4 **

	QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
02.04.03 OFFICE AREA						
02.04.03.02 EXPENSES	1.00 EA	33,665	0	0	33,665	33665.38
02.04.03.03 OPERATIONS AND MAINTENANCE	1.00 EA	532,249	0	0	532,249	532248.70
OFFICE AREA	1.00 EA	565,914	0	0	565,914	565914.08
02.04.04 PERSONNEL DECON/CHANGE AREA						
02.04.04.03 OPERATIONS AND MAINTENANCE	1.00 EA	56,056	0	0	56,056	56056.00
PERSONNEL DECON/CHANGE AREA	1.00 EA	56,056	0	0	56,056	56056.00
02.04.05 RECEIVING AREA/WAREHOUSE						
02.04.06 UTILITIES						
02.04.06.02 EXPENSES	1.00 EA	2,000	0	0	2,000	2000.00
UTILITIES	1.00 EA	2,000	0	0	2,000	2000.00
ANCILLARY	1.00 EA	1,555,904	0	0	1,555,904	1555904
02.05 SUPPORT						
02.05.01 SUPPORT						
02.05.01.02 EXPENSES	1.00 EA	2,241,802	0	0	2,241,802	2241802
02.05.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	1,487,122	0	0	1,487,122	1487122
SUPPORT	1.00 EA	3,728,924	0	0	3,728,924	3728924
SUPPORT	1.00 EA	3,728,924	0	0	3,728,924	3728924
02.06 RECLAMATION						
02.06.01 RECONTOUR/BACKFILL						
02.06.02 REVEGETATION						
02.06.03 DECONTAMINATION/DISPOSAL						
FY 1997	1.00 EA	14,446,861	0	0	14,446,861	14446861
03 FY 1998						

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

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** PROJECT INDIRECT SUMMARY - LEVEL 4 **

	QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
03.01 PRE-CONSTRUCTION							
03.01.01 PROCUREMENT							
03.01.02 TRAINING							
03.01.02.01 CAPITAL COSTS	1.00	EA	71,940	0	0	71,940	71940.00
TRAINING	1.00	EA	71,940	0	0	71,940	71940.00
03.01.03 SITE PREPARATION							
03.01.04 SITE MOBILIZATION							
PRE-CONSTRUCTION	1.00	EA	71,940	0	0	71,940	71940.00
03.02 EXCAVATION/DEMOLITION							
03.02.01 EXCAVATION/DEMOLITION							
03.02.01.01 CAPITAL COSTS	1.00	EA	2,968,289	0	0	2,968,289	2968289
03.02.01.03 OPERATIONS AND MAINTENANCE	1.00	EA	4,361,242	0	0	4,361,242	4361242
EXCAVATION/DEMOLITION	1.00	EA	7,329,531	0	0	7,329,531	7329531
EXCAVATION/DEMOLITION	1.00	EA	7,329,531	0	0	7,329,531	7329531
03.03 TRANSPORTATION							
03.03.01 RAIL							
03.03.01.01 CAPITAL COSTS	1.00	EA	518,916	0	0	518,916	518916.15
03.03.01.03 OPERATIONS AND MAINTENANCE	1.00	EA	2,244,010	0	0	2,244,010	2244010
RAIL	1.00	EA	2,762,926	0	0	2,762,926	2762926
03.03.02 ROAD							
03.03.02.01 CAPITAL COSTS	1.00	EA	1,890,914	0	0	1,890,914	1890914
03.03.02.03 OPERATIONS AND MAINTENANCE	1.00	EA	3,728,465	0	0	3,728,465	3728465
ROAD	1.00	EA	5,619,379	0	0	5,619,379	5619379
03.03.03 CONTAINERS							

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

		QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
03.03.03.01	CAPITAL COSTS	1.00	EA	281,134	0	0	281,134	281134.11
03.03.03.03	OPERATIONS AND MAINTENANCE	1.00	EA	1,547,387	0	0	1,547,387	1547387
	CONTAINERS	1.00	EA	1,828,521	0	0	1,828,521	1828521
	TRANSPORTATION	1.00	EA	10,210,826	0	0	10,210,826	10210826
03.04	ANCILLARY							
03.04.01	EQUIPMENT DECON FACILITY							
03.04.01.03	OPERATIONS AND MAINTENANCE	1.00	EA	193,657	0	0	193,657	193656.69
	EQUIPMENT DECON FACILITY	1.00	EA	193,657	0	0	193,657	193656.69
03.04.02	SURVEY STATION							
03.04.02.03	OPERATIONS AND MAINTENANCE	1.00	EA	1,618,730	0	0	1,618,730	1618730
	SURVEY STATION	1.00	EA	1,618,730	0	0	1,618,730	1618730
03.04.03	OFFICE AREA							
03.04.03.02	EXPENSES	1.00	EA	33,665	0	0	33,665	33665.38
03.04.03.03	OPERATIONS AND MAINTENANCE	1.00	EA	532,249	0	0	532,249	532248.70
	OFFICE AREA	1.00	EA	565,914	0	0	565,914	565914.08
03.04.04	PERSONNEL DECON/CHANGE AREA							
03.04.04.03	OPERATIONS AND MAINTENANCE	1.00	EA	56,056	0	0	56,056	56056.00
	PERSONNEL DECON/CHANGE AREA	1.00	EA	56,056	0	0	56,056	56056.00
03.04.05	RECEIVING AREA/WAREHOUSE							
03.04.06	UTILITIES							
03.04.06.02	EXPENSES	1.00	EA	2,000	0	0	2,000	2000.00
	UTILITIES	1.00	EA	2,000	0	0	2,000	2000.00
	ANCILLARY	1.00	EA	2,436,357	0	0	2,436,357	2436357
03.05	SUPPORT							

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** PROJECT INDIRECT SUMMARY - LEVEL 4 **

	QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
03.05.01 SUPPORT						
03.05.01.02 EXPENSES	1.00 EA	3,947,248	0	0	3,947,248	3947248
03.05.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	2,128,008	0	0	2,128,008	2128008
SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
03.06 RECLAMATION						
03.06.01 RECONTOUR/BACKFILL						
03.06.01.01 CAPITAL COSTS	1.00 EA	1,206,170	0	0	1,206,170	1206170
03.06.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	13,455	0	0	13,455	13454.84
RECONTOUR/BACKFILL	1.00 EA	1,219,625	0	0	1,219,625	1219625
03.06.02 REVEGETATION						
03.06.03 DEMOBILIZATION						
RECLAMATION	1.00 EA	1,219,625	0	0	1,219,625	1219625
FY 1998	1.00 EA	27,343,534	0	0	27,343,534	27343534
04 FY 1999						
04.01 PRE-CONSTRUCTION						
04.01.01 PROCUREMENT						
04.01.02 TRAINING						
04.01.02.01 CAPITAL COSTS	1.00 EA	71,940	0	0	71,940	71940.00
TRAINING	1.00 EA	71,940	0	0	71,940	71940.00
04.01.03 SITE PREPARATION						
04.01.04 SITE MOBILIZATION						
PRE-CONSTRUCTION	1.00 EA	71,940	0	0	71,940	71940.00

		QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
04.02	EXCAVATION/DEMOLITION						
04.02.01	EXCAVATION/DEMOLITION						
04.02.01.01	CAPITAL COSTS	1.00 EA	3,276,254	0	0	3,276,254	3276254
04.02.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	4,307,988	0	0	4,307,988	4307988
	EXCAVATION/DEMOLITION	1.00 EA	7,584,242	0	0	7,584,242	7584242
	EXCAVATION/DEMOLITION	1.00 EA	7,584,242	0	0	7,584,242	7584242
04.03	TRANSPORTATION						
04.03.01	RAIL						
04.03.01.01	CAPITAL COSTS	1.00 EA	518,916	0	0	518,916	518916.15
04.03.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	2,244,010	0	0	2,244,010	2244010
	RAIL	1.00 EA	2,762,926	0	0	2,762,926	2762926
04.03.02	ROAD						
04.03.02.01	CAPITAL COSTS	1.00 EA	1,890,914	0	0	1,890,914	1890914
04.03.02.03	OPERATIONS AND MAINTENANCE	1.00 EA	5,301,750	0	0	5,301,750	5301750
	ROAD	1.00 EA	7,192,664	0	0	7,192,664	7192664
04.03.03	CONTAINERS						
04.03.03.01	CAPITAL COSTS	1.00 EA	281,134	0	0	281,134	281134.11
04.03.03.03	OPERATIONS AND MAINTENANCE	1.00 EA	1,547,387	0	0	1,547,387	1547387
	CONTAINERS	1.00 EA	1,828,521	0	0	1,828,521	1828521
	TRANSPORTATION	1.00 EA	11,784,111	0	0	11,784,111	11784111
04.04	ANCILLARY						
04.04.01	EQUIPMENT DECON FACILITY						
04.04.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	193,657	0	0	193,657	193656.69
	EQUIPMENT DECON FACILITY	1.00 EA	193,657	0	0	193,657	193656.69
04.04.02	SURVEY STATION						

	QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
04.04.02.03 OPERATIONS AND MAINTENANCE	1.00 EA	1,618,730	0	0	1,618,730	1618730
SURVEY STATION	1.00 EA	1,618,730	0	0	1,618,730	1618730
04.04.03 OFFICE AREA						
04.04.03.02 EXPENSES	1.00 EA	33,665	0	0	33,665	33665.38
04.04.03.03 OPERATIONS AND MAINTENANCE	1.00 EA	532,249	0	0	532,249	532248.70
OFFICE AREA	1.00 EA	565,914	0	0	565,914	565914.08
04.04.04 PERSONNEL DECON/CHANGE AREA						
04.04.04.03 OPERATIONS AND MAINTENANCE	1.00 EA	56,056	0	0	56,056	56056.00
PERSONNEL DECON/CHANGE AREA	1.00 EA	56,056	0	0	56,056	56056.00
04.04.05 RECEIVING AREA/WAREHOUSE						
04.04.06 UTILITIES						
04.04.06.02 EXPENSES	1.00 EA	2,000	0	0	2,000	2000.00
UTILITIES	1.00 EA	2,000	0	0	2,000	2000.00
ANCILLARY	1.00 EA	2,436,357	0	0	2,436,357	2436357
04.05 SUPPORT						
04.05.01 SUPPORT						
04.05.01.02 EXPENSES	1.00 EA	3,947,248	0	0	3,947,248	3947248
04.05.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	2,128,008	0	0	2,128,008	2128008
SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
04.06 RECLAMATION						
04.06.01 RECONTOUR/BACKFILL						
04.06.01.01 CAPITAL COSTS	1.00 EA	756,821	0	0	756,821	756820.52
04.06.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	87,229	0	0	87,229	87229.26

	QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
RECONTOUR/BACKFILL	1.00 EA	844,050	0	0	844,050	844049.78
04.06.02 REVEGETATION						
04.06.03 DECONTAMINATION/DISPOSAL						
RECLAMATION	1.00 EA	844,050	0	0	844,050	844049.78
FY 1999	1.00 EA	28,795,955	0	0	28,795,955	28795955
05 FY 2000						
05.01 PRE-CONSTRUCTION						
05.01.01 PROCUREMENT						
05.01.02 TRAINING						
05.01.02.01 CAPITAL COSTS	1.00 EA	71,940	0	0	71,940	71940.00
TRAINING	1.00 EA	71,940	0	0	71,940	71940.00
05.01.03 SITE PREPARATION						
05.01.04 SITE MOBILIZATION						
PRE-CONSTRUCTION	1.00 EA	71,940	0	0	71,940	71940.00
05.02 EXCAVATION/DEMOLITION						
05.02.01 EXCAVATION/DEMOLITION						
05.02.01.01 CAPITAL COSTS	1.00 EA	2,856,110	0	0	2,856,110	2856110
05.02.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	4,415,723	0	0	4,415,723	4415723
EXCAVATION/DEMOLITION	1.00 EA	7,271,833	0	0	7,271,833	7271833
EXCAVATION/DEMOLITION	1.00 EA	7,271,833	0	0	7,271,833	7271833
05.03 TRANSPORTATION						
05.03.01 RAIL						

		QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
05.03.01.01	CAPITAL COSTS	1.00 EA	518,916	0	0	518,916	518916.15
05.03.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	2,244,010	0	0	2,244,010	2244010
	RAIL	1.00 EA	2,762,926	0	0	2,762,926	2762926
05.03.02	ROAD						
05.03.02.01	CAPITAL COSTS	1.00 EA	1,890,914	0	0	1,890,914	1890914
05.03.02.03	OPERATIONS AND MAINTENANCE	1.00 EA	5,352,298	0	0	5,352,298	5352298
	ROAD	1.00 EA	7,243,211	0	0	7,243,211	7243211
05.03.03	CONTAINERS						
05.03.03.01	CAPITAL COSTS	1.00 EA	281,134	0	0	281,134	281134.11
05.03.03.03	OPERATIONS AND MAINTENANCE	1.00 EA	1,547,387	0	0	1,547,387	1547387
	CONTAINERS	1.00 EA	1,828,521	0	0	1,828,521	1828521
	TRANSPORTATION	1.00 EA	11,834,658	0	0	11,834,658	11834658
05.04	ANCILLARY						
05.04.01	EQUIPMENT DECON FACILITY						
05.04.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	193,657	0	0	193,657	193656.69
	EQUIPMENT DECON FACILITY	1.00 EA	193,657	0	0	193,657	193656.69
05.04.02	SURVEY STATION						
05.04.02.03	OPERATIONS AND MAINTENANCE	1.00 EA	1,618,730	0	0	1,618,730	1618730
	SURVEY STATION	1.00 EA	1,618,730	0	0	1,618,730	1618730
05.04.03	OFFICE AREA						
05.04.03.02	EXPENSES	1.00 EA	33,665	0	0	33,665	33665.38
05.04.03.03	OPERATIONS AND MAINTENANCE	1.00 EA	532,249	0	0	532,249	532248.70
	OFFICE AREA	1.00 EA	565,914	0	0	565,914	565914.08
05.04.04	PERSONNEL DECON/CHANGE AREA						
05.04.04.03	OPERATIONS AND MAINTENANCE	1.00 EA	56,056	0	0	56,056	56056.00

	QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
PERSONNEL DECON/CHANGE AREA	1.00 EA	56,056	0	0	56,056	56056.00
05.04.05 RECEIVING AREA/WAREHOUSE						
05.04.06 UTILITIES						
05.04.06.02 EXPENSES	1.00 EA	2,000	0	0	2,000	2000.00
UTILITIES	1.00 EA	2,000	0	0	2,000	2000.00
ANCILLARY	1.00 EA	2,436,357	0	0	2,436,357	2436357
05.05 SUPPORT						
05.05.01 SUPPORT						
05.05.01.02 EXPENSES	1.00 EA	3,947,248	0	0	3,947,248	3947248
05.05.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	2,128,008	0	0	2,128,008	2128008
SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
SUPPORT	1.00 EA	6,075,256	0	0	6,075,256	6075256
05.06 RECLAMATION						
05.06.01 RECONTOUR/BACKFILL						
05.06.01.01 CAPITAL COSTS	1.00 EA	2,245,841	0	0	2,245,841	2245841
05.06.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	89,512	0	0	89,512	89512.48
RECONTOUR/BACKFILL	1.00 EA	2,335,354	0	0	2,335,354	2335354
05.06.02 REVEGETATION						
05.06.03 DEMOBILIZATION						
RECLAMATION	1.00 EA	2,335,354	0	0	2,335,354	2335354
FY 2000	1.00 EA	30,025,398	0	0	30,025,398	30025398
06 FY 2001						
06.01 PRE-CONSTRUCTION						

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** PROJECT INDIRECT SUMMARY - LEVEL 4 **

	QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
06.01.01 PROCUREMENT							
06.01.02 TRAINING							
06.01.02.01 CAPITAL COSTS	1.00	EA	71,940	0	0	71,940	71940.00
TRAINING	1.00	EA	71,940	0	0	71,940	71940.00
06.01.03 SITE PREPARATION							
06.01.04 SITE MOBILIZATION							
PRE-CONSTRUCTION	1.00	EA	71,940	0	0	71,940	71940.00
06.02 EXCAVATION/DEMOLITION							
06.02.01 EXCAVATION/DEMOLITION							
06.02.01.01 CAPITAL COSTS	1.00	EA	2,645,518	0	0	2,645,518	2645518
06.02.01.03 OPERATIONS AND MAINTENANCE	1.00	EA	2,535,765	0	0	2,535,765	2535765
EXCAVATION/DEMOLITION	1.00	EA	5,181,284	0	0	5,181,284	5181284
EXCAVATION/DEMOLITION	1.00	EA	5,181,284	0	0	5,181,284	5181284
06.03 TRANSPORTATION							
06.03.01 RAIL							
06.03.01.01 CAPITAL COSTS	1.00	EA	432,430	0	0	432,430	432430.13
06.03.01.03 OPERATIONS AND MAINTENANCE	1.00	EA	2,244,010	0	0	2,244,010	2244010
RAIL	1.00	EA	2,676,440	0	0	2,676,440	2676440
06.03.02 ROAD							
06.03.02.01 CAPITAL COSTS	1.00	EA	1,445,856	0	0	1,445,856	1445856
06.03.02.03 OPERATIONS AND MAINTENANCE	1.00	EA	2,721,610	0	0	2,721,610	2721610
ROAD	1.00	EA	4,167,467	0	0	4,167,467	4167467
06.03.03 CONTAINERS							
06.03.03.01 CAPITAL COSTS	1.00	EA	234,278	0	0	234,278	234278.42
06.03.03.03 OPERATIONS AND MAINTENANCE	1.00	EA	1,308,165	0	0	1,308,165	1308165

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

	QUANTITY	UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
CONTAINERS	1.00	EA	1,542,443	0	0	1,542,443	1542443
TRANSPORTATION	1.00	EA	8,386,350	0	0	8,386,350	8386350
06.04 ANCILLARY							
06.04.01 EQUIPMENT DECON FACILITY							
06.04.01.03 OPERATIONS AND MAINTENANCE	1.00	EA	193,657	0	0	193,657	193656.69
EQUIPMENT DECON FACILITY	1.00	EA	193,657	0	0	193,657	193656.69
06.04.02 SURVEY STATION							
06.04.02.03 OPERATIONS AND MAINTENANCE	1.00	EA	809,365	0	0	809,365	809365.17
SURVEY STATION	1.00	EA	809,365	0	0	809,365	809365.17
06.04.03 OFFICE AREA							
06.04.03.02 EXPENSES	1.00	EA	33,665	0	0	33,665	33665.38
06.04.03.03 OPERATIONS AND MAINTENANCE	1.00	EA	532,249	0	0	532,249	532248.70
OFFICE AREA	1.00	EA	565,914	0	0	565,914	565914.08
06.04.04 PERSONNEL DECON/CHANGE AREA							
06.04.04.03 OPERATIONS AND MAINTENANCE	1.00	EA	56,056	0	0	56,056	56056.00
PERSONNEL DECON/CHANGE AREA	1.00	EA	56,056	0	0	56,056	56056.00
06.04.05 RECEIVING AREA/WAREHOUSE							
06.04.06 UTILITIES							
06.04.06.02 EXPENSES	1.00	EA	2,000	0	0	2,000	2000.00
UTILITIES	1.00	EA	2,000	0	0	2,000	2000.00
ANCILLARY	1.00	EA	1,626,992	0	0	1,626,992	1626992
06.05 SUPPORT							
06.05.01 SUPPORT							

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** PROJECT INDIRECT SUMMARY - LEVEL 4 **

		QUANTITY UOM	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
06.05.01.02	EXPENSES	1.00 EA	3,947,248	0	0	3,947,248	3947248
06.05.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	1,810,214	0	0	1,810,214	1810214
	SUPPORT	1.00 EA	5,757,462	0	0	5,757,462	5757462
	SUPPORT	1.00 EA	5,757,462	0	0	5,757,462	5757462
06.06	RECLAMATION						
06.06.01	RECONTOUR/BACKFILL						
06.06.01.01	CAPITAL COSTS	1.00 EA	2,245,841	0	0	2,245,841	2245841
06.06.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	954,745	0	0	954,745	954744.81
	RECONTOUR/BACKFILL	1.00 EA	3,200,586	0	0	3,200,586	3200586
06.06.02	REVEGETATION						
06.06.02.01	CAPITAL COSTS	1.00 EA	258,133	0	0	258,133	258133.00
	REVEGETATION	1.00 EA	258,133	0	0	258,133	258133.00
06.06.03	DEMOBILIZATION						
06.06.03.01	CAPITAL COSTS	1.00 EA	1,438,298	0	0	1,438,298	1438298
	DEMOBILIZATION	1.00 EA	1,438,298	0	0	1,438,298	1438298
	RECLAMATION	1.00 EA	4,897,017	0	0	4,897,017	4897017
	FY 2001	1.00 EA	25,921,045	0	0	25,921,045	25921045
	100 B/C AREA REMEDIAL ACTIVITIES	1.00 EA	144,588,635	0	0	144,588,635	144588635

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** PROJECT DIRECT SUMMARY - LEVEL 1 **

	QUANTITY	UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
01 FY 1996	1.00	EA	56,842	2,165,360	8,490,463	7,400,020	18,055,843	18055843
02 FY 1997	1.00	EA	99,605	3,849,872	7,451,411	3,145,578	14,446,861	14446861
03 FY 1998	1.00	EA	221,449	8,674,493	13,918,018	4,751,024	27,343,534	27343534
04 FY 1999	1.00	EA	238,108	9,422,786	14,622,145	4,751,024	28,795,955	28795955
05 FY 2000	1.00	EA	239,131	9,465,667	15,808,707	4,751,024	30,025,398	30025398
06 FY 2001	1.00	EA	168,338	6,414,415	13,135,244	6,371,385	25,921,045	25921045
100 B/C AREA REMEDIAL ACTIVITIES	1.00	EA	1,023,473	39,992,593	73,425,988	31,170,054	144,588,635	144588635

** PROJECT DIRECT SUMMARY - LEVEL 2 **

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
01 FY 1996							
01.01 PRE-CONSTRUCTION	1.00 EA	30,292	1,148,639	123,485	3,340,006	4,612,131	4612131
01.02 EXCAVATION/DEMOLITION	1.00 EA	0	0	1,877,499	0	1,877,499	1877499
01.03 TRANSPORTATION	1.00 EA	23,912	886,655	3,546,281	3,388,751	7,821,687	7821687
01.04 ANCILLARY	1.00 EA	2,631	129,786	1,722,343	462,602	2,314,732	2314732
01.05 SUPPORT	1.00 EA	7	279	1,220,854	208,662	1,429,794	1429794
FY 1996	1.00 EA	56,842	2,165,360	8,490,463	7,400,020	18,055,843	18055843
02 FY 1997							
02.01 PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
02.02 EXCAVATION/DEMOLITION	1.00 EA	20,126	776,988	1,828,852	21,041	2,626,881	2626881
02.03 TRANSPORTATION	1.00 EA	25,399	947,791	5,062,739	452,684	6,463,213	6463213
02.04 ANCILLARY	1.00 EA	18,720	880,454	232,068	443,383	1,555,904	1555904
02.05 SUPPORT	1.00 EA	35,360	1,244,640	327,753	2,156,531	3,728,924	3728924
FY 1997	1.00 EA	99,605	3,849,872	7,451,411	3,145,578	14,446,861	14446861
03 FY 1998							
03.01 PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
03.02 EXCAVATION/DEMOLITION	1.00 EA	66,851	2,612,694	4,695,796	21,041	7,329,531	7329531
03.03 TRANSPORTATION	1.00 EA	62,911	2,452,200	7,305,942	452,684	10,210,826	10210826
03.04 ANCILLARY	1.00 EA	37,440	1,760,907	232,068	443,383	2,436,357	2436357
03.05 SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
03.06 RECLAMATION	1.00 EA	167	6,349	1,213,275	0	1,219,625	1219625
FY 1998	1.00 EA	221,449	8,674,493	13,918,018	4,751,024	27,343,534	27343534
04 FY 1999							
04.01 PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
04.02 EXCAVATION/DEMOLITION	1.00 EA	68,105	2,660,359	4,902,842	21,041	7,584,242	7584242
04.03 TRANSPORTATION	1.00 EA	77,400	3,117,963	8,213,464	452,684	11,784,111	11784111
04.04 ANCILLARY	1.00 EA	37,440	1,760,907	232,068	443,383	2,436,357	2436357
04.05 SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
04.06 RECLAMATION	1.00 EA	1,083	41,214	302,835	0	844,050	844049.78
FY 1999	1.00 EA	238,108	9,422,786	14,622,145	4,751,024	28,795,955	28795955
05 FY 2000							
05.01 PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
05.02 EXCAVATION/DEMOLITION	1.00 EA	68,677	2,682,318	4,568,474	21,041	7,271,833	7271833
05.03 TRANSPORTATION	1.00 EA	77,866	3,139,353	8,242,622	452,684	11,834,658	11834658

** PROJECT DIRECT SUMMARY - LEVEL 2 **

	QUANTITY	UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
05.04 ANCILLARY	1.00	EA	37,440	1,760,907	232,068	443,383	2,436,357	2436357
05.05 SUPPORT	1.00	EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
05.06 RECLAMATION	1.00	EA	1,869	40,747	2,294,607	0	2,335,354	2335354
FY 2000	1.00	EA	239,131	9,465,667	15,808,707	4,751,024	30,025,398	30025398
06 FY 2001								
06.01 PRE-CONSTRUCTION	1.00	EA	0	0	0	71,940	71,940	71940.00
06.02 EXCAVATION/DEMOLITION	1.00	EA	39,285	1,541,233	3,619,010	21,041	5,181,284	5181284
06.03 TRANSPORTATION	1.00	EA	49,479	1,868,102	6,065,565	452,684	8,386,350	8386350
06.04 ANCILLARY	1.00	EA	20,800	951,542	232,068	443,383	1,626,992	1626992
06.05 SUPPORT	1.00	EA	45,760	1,555,384	440,101	3,761,977	5,757,462	5757462
06.06 RECLAMATION	1.00	EA	13,014	498,155	2,778,501	1,620,361	4,897,017	4897017
FY 2001	1.00	EA	168,338	6,414,415	13,135,244	6,371,385	25,921,045	25921045
100 B/C AREA REMEDIAL ACTIVITIES	1.00	EA	1,023,473	39,992,593	73,425,988	31,170,054	144,588,635	144588635

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

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** PROJECT DIRECT SUMMARY - LEVEL 3 **

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
01 FY 1996							
01.01 PRE-CONSTRUCTION							
01.01.02 TRAINING	1.00 EA	15,120	584,968	685	340,076	925,729	925729.23
01.01.03 SITE PREPARATION	1.00 EA	11,810	436,273	122,800	319,575	878,648	878648.28
01.01.04 SITE MOBILIZATION	1.00 EA	3,362	127,399	0	2,680,354	2,807,753	2807753
PRE-CONSTRUCTION	1.00 EA	30,292	1,148,639	123,485	3,340,006	4,612,131	4612131
01.02 EXCAVATION/DEMOLITION							
01.02.01 EXCAVATION/DEMOLITION	1.00 EA	0	0	1,877,499	0	1,877,499	1877499
EXCAVATION/DEMOLITION	1.00 EA	0	0	1,877,499	0	1,877,499	1877499
01.03 TRANSPORTATION							
01.03.01 RAIL	1.00 EA	631	27,609	294,855	2,075,938	2,398,401	2398401
01.03.02 ROAD	1.00 EA	23,281	859,046	1,714,811	1,312,813	3,886,670	3886670
01.03.03 CONTAINERS	1.00 EA	0	0	1,536,616	0	1,536,616	1536616
TRANSPORTATION	1.00 EA	23,912	886,655	3,546,281	3,388,751	7,821,687	7821687
01.04 ANCILLARY							
01.04.01 EQUIPMENT DECON FACILITY	1.00 EA	328	15,436	823,313	121,870	960,619	960619.17
01.04.03 OFFICE AREA	1.00 EA	0	0	633,286	0	633,286	633286.10
01.04.04 PERSONNEL DECONTAMINATION	1.00 EA	0	0	246,382	0	246,382	246382.07
01.04.06 UTILITIES	1.00 EA	2,302	114,351	19,362	340,732	474,444	474444.29
ANCILLARY	1.00 EA	2,631	129,786	1,722,343	462,602	2,314,732	2314732
01.05 SUPPORT							
01.05.01 SUPPORT	1.00 EA	7	279	1,220,854	208,662	1,429,794	1429794
SUPPORT	1.00 EA	7	279	1,220,854	208,662	1,429,794	1429794
01.06 RECLAMATION							
FY 1996	1.00 EA	55,842	2,165,360	8,490,463	7,400,020	18,055,843	18055843
02 FY 1997							

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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** PROJECT DIRECT SUMMARY - LEVEL 3 **

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
02.01 PRE-CONSTRUCTION							
02.01.02 TRAINING	1.00 EA	0	0	0	71,940	71,940	71940.00
PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
02.02 EXCAVATION/DEMOLITION							
02.02.01 EXCAVATION/DEMOLITION	1.00 EA	20,126	776,988	1,828,852	21,041	2,626,881	2626881
EXCAVATION/DEMOLITION	1.00 EA	20,126	776,988	1,828,852	21,041	2,626,881	2626881
02.03 TRANSPORTATION							
02.03.01 RAIL	1.00 EA	8,320	228,301	1,702,620	380,000	2,310,921	2310921
02.03.02 ROAD	1.00 EA	12,919	561,460	2,463,321	72,684	3,097,464	3097464
02.03.03 CONTAINERS	1.00 EA	4,160	158,030	896,798	0	1,054,828	1054828
TRANSPORTATION	1.00 EA	25,399	947,791	5,062,739	452,684	6,463,213	6463213
02.04 ANCILLARY							
02.04.01 EQUIPMENT DECON FACILITY	1.00 EA	2,080	71,088	0	51,480	122,568	122568.34
02.04.02 SURVEY STATION	1.00 EA	16,640	809,365	0	0	809,365	809365.17
02.04.03 OFFICE AREA	1.00 EA	0	0	232,068	333,847	565,914	565914.08
02.04.04 PERSONNEL DECON/CHANGE AREA	1.00 EA	0	0	0	56,056	56,056	56056.00
02.04.06 UTILITIES	1.00 EA	0	0	0	2,000	2,000	2000.00
ANCILLARY	1.00 EA	18,720	880,454	232,068	443,383	1,555,904	1555904
02.05 SUPPORT							
02.05.01 SUPPORT	1.00 EA	35,360	1,244,640	327,753	2,156,531	3,728,924	3728924
SUPPORT	1.00 EA	35,360	1,244,640	327,753	2,156,531	3,728,924	3728924
02.06 RECLAMATION							
FY 1997	1.00 EA	99,605	3,349,872	7,451,411	3,145,578	14,446,861	14446861

03 FY 1998

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
03.01 PRE-CONSTRUCTION							
03.01.02 TRAINING	1.00 EA	0	0	0	71,940	71,940	71940.00
PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
03.02 EXCAVATION/DEMOLITION							
03.02.01 EXCAVATION/DEMOLITION	1.00 EA	66,851	2,612,694	4,695,796	21,041	7,329,531	7329531
EXCAVATION/DEMOLITION	1.00 EA	66,851	2,612,694	4,595,796	21,041	7,329,531	7329531
03.03 TRANSPORTATION							
03.03.01 RAIL	1.00 EA	16,640	456,602	1,926,324	380,000	2,762,926	2762926
03.03.02 ROAD	1.00 EA	37,951	1,679,538	3,867,157	72,684	5,619,379	5619379
03.03.03 CONTAINERS	1.00 EA	8,320	316,060	1,512,461	0	1,828,521	1828521
TRANSPORTATION	1.00 EA	62,911	2,452,200	7,305,942	452,684	10,210,826	10210826
03.04 ANCILLARY							
03.04.01 EQUIPMENT DECON FACILITY	1.00 EA	4,160	142,177	0	51,480	193,657	193656.69
03.04.02 SURVEY STATION	1.00 EA	33,280	1,618,730	0	0	1,618,730	1618730
03.04.03 OFFICE AREA	1.00 EA	0	0	232,068	333,847	565,914	565914.08
03.04.04 PERSONNEL DECON/CHANGE AREA	1.00 EA	0	0	0	56,056	56,056	56056.00
03.04.06 UTILITIES	1.00 EA	0	0	0	2,000	2,000	2000.00
ANCILLARY	1.00 EA	37,440	1,760,907	232,068	443,383	2,436,357	2436357
03.05 SUPPORT							
03.05.01 SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
03.06 RECLAMATION							
03.06.01 RECONTOUR/BACKFILL	1.00 EA	167	6,349	1,213,275	0	1,219,625	1219625
RECLAMATION	1.00 EA	167	6,349	1,213,275	0	1,219,625	1219625
FY 1998	1.00 EA	221,449	8,674,493	13,318,018	4,751,024	27,343,534	27343534

04 FY 1999

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** PROJECT DIRECT SUMMARY - LEVEL 3 **

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
04.01 PRE-CONSTRUCTION							
04.01.02 TRAINING	1.00 EA	0	0	0	71,940	71,940	71940.00
PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
04.02 EXCAVATION/DEMOLITION							
04.02.01 EXCAVATION/DEMOLITION	1.00 EA	68,105	2,660,359	4,902,842	21,041	7,584,242	7584242
EXCAVATION/DEMOLITION	1.00 EA	68,105	2,660,359	4,902,842	21,041	7,584,242	7584242
04.03 TRANSPORTATION							
04.03.01 RAIL	1.00 EA	16,640	456,602	1,926,324	380,000	2,762,926	2762926
04.03.02 ROAD	1.00 EA	52,440	2,345,301	4,774,679	72,684	7,192,664	7192664
04.03.03 CONTAINERS	1.00 EA	8,320	316,060	1,512,461	0	1,828,521	1828521
TRANSPORTATION	1.00 EA	77,400	3,117,963	8,213,464	452,684	11,784,111	11784111
04.04 ANCILLARY							
04.04.01 EQUIPMENT DECON FACILITY	1.00 EA	4,160	142,177	0	51,480	193,657	193656.69
04.04.02 SURVEY STATION	1.00 EA	33,280	1,618,730	0	0	1,618,730	1618730
04.04.03 OFFICE AREA	1.00 EA	0	0	232,068	333,847	565,914	565914.08
04.04.04 PERSONNEL DECON/CHANGE AREA	1.00 EA	0	0	0	56,056	56,056	56056.00
04.04.06 UTILITIES	1.00 EA	0	0	0	2,000	2,000	2000.00
ANCILLARY	1.00 EA	37,440	1,760,907	232,068	443,383	2,436,357	2436357
04.05 SUPPORT							
04.05.01 SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
04.06 RECLAMATION							
04.06.01 RECONTOUR/BACKFILL	1.00 EA	1,083	41,214	802,835	0	844,050	844049.78
RECLAMATION	1.00 EA	1,083	41,214	802,835	0	844,050	844049.78
FY 1999	1.00 EA	238,108	9,422,786	14,622,145	4,751,024	28,795,955	28795955

05 FY 2000

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
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** PROJECT DIRECT SUMMARY - LEVEL 3 **

	QUANTITY	UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
05.01 PRE-CONSTRUCTION								
05.01.02 TRAINING	1.00	EA	0	0	0	71,940	71,940	71940.00
PRE-CONSTRUCTION	1.00	EA	0	0	0	71,940	71,940	71940.00
05.02 EXCAVATION/DEMOLITION								
05.02.01 EXCAVATION/DEMOLITION	1.00	EA	68,677	2,682,318	4,568,474	21,041	7,271,833	7271833
EXCAVATION/DEMOLITION	1.00	EA	68,677	2,682,318	4,568,474	21,041	7,271,833	7271833
05.03 TRANSPORTATION								
05.03.01 RAIL	1.00	EA	16,640	456,602	1,926,324	380,000	2,762,926	2762926
05.03.02 ROAD	1.00	EA	52,906	2,366,691	4,803,837	72,684	7,243,211	7243211
05.03.03 CONTAINERS	1.00	EA	8,320	316,060	1,512,461	0	1,828,521	1828521
TRANSPORTATION	1.00	EA	77,866	3,139,353	8,242,622	452,684	11,834,658	11834658
05.04 ANCILLARY								
05.04.01 EQUIPMENT DECON FACILITY	1.00	EA	4,160	142,177	0	51,480	193,657	193656.69
05.04.02 SURVEY STATION	1.00	EA	33,280	1,618,730	0	0	1,618,730	1618730
05.04.03 OFFICE AREA	1.00	EA	0	0	232,068	333,847	565,914	565914.08
05.04.04 PERSONNEL DECON/CHANGE AREA	1.00	EA	0	0	0	56,056	56,056	56056.00
05.04.06 UTILITIES	1.00	EA	0	0	0	2,000	2,000	2000.00
ANCILLARY	1.00	EA	37,440	1,760,907	232,068	443,383	2,436,357	2436357
05.05 SUPPORT								
05.05.01 SUPPORT	1.00	EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
SUPPORT	1.00	EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
05.06 RECLAMATION								
05.06.01 RECONTOUR/BACKFILL	1.00	EA	1,069	40,747	2,294,607	0	2,335,354	2335354
RECLAMATION	1.00	EA	1,069	40,747	2,294,607	0	2,335,354	2335354
FY 2000	1.00	EA	239,131	9,465,667	15,808,707	4,751,024	30,025,398	30025398

06 FY 2001

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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** PROJECT DIRECT SUMMARY - LEVEL 3 **

	QUANTITY	UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
06.01 PRE-CONSTRUCTION								
06.01.02 TRAINING	1.00	EA	0	0	0	71,940	71,940	71940.00
PRE-CONSTRUCTION	1.00	EA	0	0	0	71,940	71,940	71940.00
06.02 EXCAVATION/DEMOLITION								
06.02.01 EXCAVATION/DEMOLITION	1.00	EA	39,285	1,541,233	3,619,010	21,041	5,181,284	5181284
EXCAVATION/DEMOLITION	1.00	EA	39,285	1,541,233	3,619,010	21,041	5,181,284	5181284
06.03 TRANSPORTATION								
06.03.01 RAIL	1.00	EA	16,640	456,602	1,839,838	380,000	2,676,440	2676440
06.03.02 ROAD	1.00	EA	28,679	1,253,470	2,841,313	72,684	4,167,467	4167467
06.03.03 CONTAINERS	1.00	EA	4,160	158,030	1,384,413	0	1,542,443	1542443
TRANSPORTATION	1.00	EA	49,479	1,868,102	6,065,565	452,684	8,386,350	8386350
06.04 ANCILLARY								
06.04.01 EQUIPMENT DECON FACILITY	1.00	EA	4,160	142,177	0	51,480	193,657	193656.69
06.04.02 SURVEY STATION	1.00	EA	16,640	809,365	0	0	809,365	809365.17
06.04.03 OFFICE AREA	1.00	EA	0	0	232,068	333,847	565,914	565914.08
06.04.04 PERSONNEL DECON/CHANGE AREA	1.00	EA	0	0	0	56,056	56,056	56056.00
06.04.06 UTILITIES	1.00	EA	0	0	0	2,000	2,000	2000.00
ANCILLARY	1.00	EA	20,800	951,542	232,068	443,383	1,626,992	1626992
06.05 SUPPORT								
06.05.01 SUPPORT	1.00	EA	45,760	1,555,384	440,101	3,761,977	5,757,462	5757462
SUPPORT	1.00	EA	45,760	1,555,384	440,101	3,761,977	5,757,462	5757462
06.06 RECLAMATION								
06.06.01 RECONTOUR/BACKFILL	1.00	EA	11,123	424,434	2,776,152	0	3,200,586	3200586
06.06.02 REVEGETATION	1.00	EA	0	0	0	258,133	258,133	258133.00
06.06.03 DEMOBILIZATION	1.00	EA	1,891	73,721	2,349	1,362,228	1,438,298	1438298
RECLAMATION	1.00	EA	13,014	498,155	2,778,501	1,620,361	4,897,017	4897017
FY 2001	1.00	EA	168,338	6,414,415	13,135,244	6,371,385	25,921,045	25921045

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

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** PROJECT DIRECT SUMMARY - LEVEL 3 **

	QUANTITY	UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
100 B/C AREA REMEDIAL ACTIVITIES	1.00	EA	1,023,473	39,992,593	73,425,988	31,170,054	144,588,635	144588635

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
01 FY 1996							
01.01 PRE-CONSTRUCTION							
01.01.01 PROCUREMENT							
01.01.02 TRAINING							
01.01.02.01 CAPITAL COSTS	1.00 EA	15,120	584,968	685	340,076	925,729	925729.23
TRAINING	1.00 EA	15,120	584,968	685	340,076	925,729	925729.23
01.01.03 SITE PREPARATION							
01.01.03.01 CAPITAL COSTS	1.00 EA	8,601	304,144	96,411	134,356	534,911	534910.63
01.01.03.02 EXPENSES	1.00 EA	3,208	132,129	26,389	185,220	343,738	343737.64
SITE PREPARATION	1.00 EA	11,810	436,273	122,800	319,575	878,648	878648.28
01.01.04 SITE MOBILIZATION							
01.01.04.01 CAPITAL COSTS	1.00 EA	3,362	127,399	0	2,680,354	2,807,753	2807753
SITE MOBILIZATION	1.00 EA	3,362	127,399	0	2,680,354	2,807,753	2807753
PRE-CONSTRUCTION	1.00 EA	30,292	1,148,639	123,485	3,340,006	4,612,131	4612131
01.02 EXCAVATION/DEMOLITION							
01.02.01 EXCAVATION/DEMOLITION							
01.02.01.01 CAPITAL COSTS	1.00 EA	0	0	1,877,499	0	1,877,499	1877499
EXCAVATION/DEMOLITION	1.00 EA	0	0	1,877,499	0	1,877,499	1877499
EXCAVATION/DEMOLITION	1.00 EA	0	0	1,877,499	0	1,877,499	1877499
01.03 TRANSPORTATION							
01.03.01 RAIL							
01.03.01.01 CAPITAL COSTS	1.00 EA	631	27,609	294,855	2,075,938	2,398,401	2398401
RAIL	1.00 EA	631	27,609	294,855	2,075,938	2,398,401	2398401

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
01.03.02 ROAD							
01.03.02.01 CAPITAL COSTS	1.00 EA	23,281	859,046	1,714,811	1,312,813	3,886,670	3886670
ROAD	1.00 EA	23,281	859,046	1,714,811	1,312,813	3,886,670	3886670
01.03.03 CONTAINERS							
01.03.03.01 CAPITAL COSTS	1.00 EA	0	0	1,536,616	0	1,536,616	1536616
CONTAINERS	1.00 EA	0	0	1,536,616	0	1,536,616	1536616
TRANSPORTATION	1.00 EA	23,912	886,655	3,546,281	3,388,751	7,821,687	7821687
01.04 ANCILLARY							
01.04.01 EQUIPMENT DECON FACILITY							
01.04.01.01 CAPITAL COSTS	1.00 EA	328	15,436	823,313	121,870	960,619	960619.17
EQUIPMENT DECON FACILITY	1.00 EA	328	15,436	823,313	121,870	960,619	960619.17
01.04.02 SURVEY STATION							
01.04.03 OFFICE AREA							
01.04.03.01 CAPITAL COSTS	1.00 EA	0	0	633,286	0	633,286	633286.10
OFFICE AREA	1.00 EA	0	0	633,286	0	633,286	633286.10
01.04.04 PERSONNEL DECONTAMINATION							
01.04.04.01 CAPITAL COSTS	1.00 EA	0	0	246,382	0	246,382	246382.07
PERSONNEL DECONTAMINATION	1.00 EA	0	0	246,382	0	246,382	246382.07
01.04.05 RECEIVING AREA/WAREHOUSE							
01.04.06 UTILITIES							
01.04.06.01 CAPITAL COSTS	1.00 EA	2,302	114,351	19,362	338,732	472,444	472444.29
01.04.06.02 EXPENSES	1.00 EA	0	0	0	2,000	2,000	2000.00
UTILITIES	1.00 EA	2,302	114,351	19,362	340,732	474,444	474444.29
ANCILLARY	1.00 EA	2,631	129,786	1,722,343	462,602	2,314,732	2314732

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
01.05 SUPPORT							
01.05.01 SUPPORT							
01.05.01.01 CAPITAL COSTS	1.00 EA	7	279	1,211,876	83,288	1,295,443	1295443
01.05.01.02 EXPENSES	1.00 EA	0	0	0	110,645	110,645	110644.71
01.05.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	0	0	8,977	14,729	23,706	23706.21
SUPPORT	1.00 EA	7	279	1,220,854	208,662	1,429,794	1429794
SUPPORT	1.00 EA	7	279	1,220,854	208,662	1,429,794	1429794
01.06 RECLAMATION							
01.06.01 RECONTOUR/BACKFILL							
01.06.02 REVEGETATION							
01.06.03 DEMOBILIZATION							
FY 1996	1.00 EA	56,842	2,165,360	8,490,463	7,400,020	18,055,843	18055843
02 FY 1997							
02.01 PRE-CONSTRUCTION							
02.01.01 PROCUREMENT							
02.01.02 TRAINING							
02.01.02.01 CAPITAL COSTS	1.00 EA	0	0	0	71,940	71,940	71940.00
TRAINING	1.00 EA	0	0	0	71,940	71,940	71940.00
02.01.03 SITE PREPARATION							
02.01.04 SITE MOBILIZATION							
PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
02.02 EXCAVATION/DEMOLITION							
02.02.01 EXCAVATION/DEMOLITION							

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** PROJECT DIRECT SUMMARY - LEVEL 4 **

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
02.02.01.01 CAPITAL COSTS	1.00 EA	0	0	1,263,550	21,041	1,284,591	1284591
02.02.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	20,126	776,988	565,302	0	1,342,290	1342290
EXCAVATION/DEMOLITION	1.00 EA	20,126	776,988	1,828,852	21,041	2,626,881	2626881
EXCAVATION/DEMOLITION	1.00 EA	20,126	776,988	1,828,852	21,041	2,626,881	2626881
02.03 TRANSPORTATION							
02.03.01 RAIL							
02.03.01.01 CAPITAL COSTS	1.00 EA	0	0	518,916	0	518,916	518916.15
02.03.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	8,320	228,301	1,183,704	380,000	1,792,005	1792005
RAIL	1.00 EA	8,320	228,301	1,702,620	380,000	2,310,921	2310921
02.03.02 ROAD							
02.03.02.01 CAPITAL COSTS	1.00 EA	0	0	1,818,230	72,684	1,890,914	1890914
02.03.02.03 OPERATIONS AND MAINTENANCE	1.00 EA	12,919	561,460	645,091	0	1,206,551	1206551
ROAD	1.00 EA	12,919	561,460	2,463,321	72,684	3,097,464	3097464
02.03.03 CONTAINERS							
02.03.03.01 CAPITAL COSTS	1.00 EA	0	0	281,134	0	281,134	281134.11
02.03.03.03 OPERATIONS AND MAINTENANCE	1.00 EA	4,160	158,030	615,663	0	773,694	773693.58
CONTAINERS	1.00 EA	4,160	158,030	896,798	0	1,054,828	1054828
TRANSPORTATION	1.00 EA	25,399	947,791	5,062,739	452,684	6,463,213	6463213
02.04 ANCILLARY							
02.04.01 EQUIPMENT DECON FACILITY							
02.04.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	2,080	71,088	0	51,480	122,568	122568.34
EQUIPMENT DECON FACILITY	1.00 EA	2,080	71,088	0	51,480	122,568	122568.34
02.04.02 SURVEY STATION							
02.04.02.03 OPERATIONS AND MAINTENANCE	1.00 EA	16,640	809,365	0	0	809,365	809365.17
SURVEY STATION	1.00 EA	16,640	809,365	0	0	809,365	809365.17

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** PROJECT DIRECT SUMMARY - LEVEL 4 **

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
02.04.03 OFFICE AREA							
02.04.03.02 EXPENSES	1.00 EA	0	0	0	33,665	33,665	33665.38
02.04.03.03 OPERATIONS AND MAINTENANCE	1.00 EA	0	0	232,068	300,181	532,249	532248.70
OFFICE AREA	1.00 EA	0	0	232,068	333,847	565,914	565914.08
02.04.04 PERSONNEL DECON/CHANGE AREA							
02.04.04.03 OPERATIONS AND MAINTENANCE	1.00 EA	0	0	0	56,056	56,056	56056.00
PERSONNEL DECON/CHANGE AREA	1.00 EA	0	0	0	56,056	56,056	56056.00
02.04.05 RECEIVING AREA/WAREHOUSE							
02.04.06 UTILITIES							
02.04.06.02 EXPENSES	1.00 EA	0	0	0	2,000	2,000	2000.00
UTILITIES	1.00 EA	0	0	0	2,000	2,000	2000.00
ANCILLARY	1.00 EA	18,720	880,454	232,068	443,383	1,555,904	1555904
02.05 SUPPORT							
02.05.01 SUPPORT							
02.05.01.02 EXPENSES	1.00 EA	4,160	100,000	0	2,141,802	2,241,802	2241802
02.05.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	31,200	1,144,640	327,753	14,729	1,487,122	1487122
SUPPORT	1.00 EA	35,360	1,244,640	327,753	2,156,531	3,728,924	3728924
SUPPORT	1.00 EA	35,360	1,244,640	327,753	2,156,531	3,728,924	3728924
02.06 RECLAMATION							
02.06.01 RECONTOUR/BACKFILL							
02.06.02 REVEGETATION							
02.06.03 DECONTAMINATION/DISPOSAL							
FY 1997	1.00 EA	99,605	3,849,872	7,451,411	3,145,578	14,446,861	14446861
03 FY 1998							

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
03.01 PRE-CONSTRUCTION							
03.01.01 PROCUREMENT							
03.01.02 TRAINING							
03.01.02.01 CAPITAL COSTS	1.00 EA	0	0	0	71,940	71,940	71940.00
TRAINING	1.00 EA	0	0	0	71,940	71,940	71940.00
03.01.03 SITE PREPARATION							
03.01.04 SITE MOBILIZATION							
PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
03.02 EXCAVATION/DEMOLITION							
03.02.01 EXCAVATION/DEMOLITION							
03.02.01.01 CAPITAL COSTS	1.00 EA	0	0	2,947,248	21,041	2,968,289	2968289
03.02.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	66,851	2,612,694	1,748,548	0	4,361,242	4361242
EXCAVATION/DEMOLITION	1.00 EA	66,851	2,612,694	4,695,796	21,041	7,329,531	7329531
EXCAVATION/DEMOLITION	1.00 EA	66,851	2,612,694	4,695,796	21,041	7,329,531	7329531
03.03 TRANSPORTATION							
03.03.01 RAIL							
03.03.01.01 CAPITAL COSTS	1.00 EA	0	0	518,916	0	518,916	518916.15
03.03.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	16,640	456,602	1,407,408	380,000	2,244,010	2244010
RAIL	1.00 EA	16,640	456,602	1,926,324	380,000	2,762,926	2762926
03.03.02 ROAD							
03.03.02.01 CAPITAL COSTS	1.00 EA	0	0	1,818,230	72,684	1,890,914	1890914
03.03.02.03 OPERATIONS AND MAINTENANCE	1.00 EA	37,951	1,679,538	2,048,927	0	3,728,465	3728465
ROAD	1.00 EA	37,951	1,679,538	3,867,157	72,684	5,619,379	5619379
03.03.03 CONTAINERS							

		QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
03.03.03.01	CAPITAL COSTS	1.00 EA	0	0	281,134	0	281,134	281134.11
03.03.03.03	OPERATIONS AND MAINTENANCE	1.00 EA	8,320	316,060	1,231,327	0	1,547,387	1547387
	CONTAINERS	1.00 EA	8,320	316,060	1,512,461	0	1,828,521	1828521
	TRANSPORTATION	1.00 EA	62,911	2,452,200	7,305,942	452,684	10,210,826	10210826
03.04	ANCILLARY							
03.04.01	EQUIPMENT DECON FACILITY							
03.04.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	4,160	142,177	0	51,480	193,657	193656.69
	EQUIPMENT DECON FACILITY	1.00 EA	4,160	142,177	0	51,480	193,657	193656.69
03.04.02	SURVEY STATION							
03.04.02.03	OPERATIONS AND MAINTENANCE	1.00 EA	33,280	1,618,730	0	0	1,618,730	1618730
	SURVEY STATION	1.00 EA	33,280	1,618,730	0	0	1,618,730	1618730
03.04.03	OFFICE AREA							
03.04.03.02	EXPENSES	1.00 EA	0	0	0	33,665	33,665	33665.38
03.04.03.03	OPERATIONS AND MAINTENANCE	1.00 EA	0	0	232,068	300,181	532,249	532248.70
	OFFICE AREA	1.00 EA	0	0	232,068	333,847	565,914	565914.08
03.04.04	PERSONNEL DECON/CHANGE AREA							
03.04.04.03	OPERATIONS AND MAINTENANCE	1.00 EA	0	0	0	56,056	56,056	56056.00
	PERSONNEL DECON/CHANGE AREA	1.00 EA	0	0	0	56,056	56,056	56056.00
03.04.05	RECEIVING AREA/WAREHOUSE							
03.04.06	UTILITIES							
03.04.06.02	EXPENSES	1.00 EA	0	0	0	2,000	2,000	2000.00
	UTILITIES	1.00 EA	0	0	0	2,000	2,000	2000.00
	ANCILLARY	1.00 EA	37,440	1,760,907	232,068	443,383	2,436,357	2436357
03.05	SUPPORT							

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
03.05.01 SUPPORT							
03.05.01.02 EXPENSES	1.00 EA	8,320	200,000	0	3,747,248	3,947,248	3947248
03.05.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	45,760	1,642,342	470,936	14,729	2,128,008	2128008
SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
03.06 RECLAMATION							
03.06.01 RECONTOUR/BACKFILL							
03.06.01.01 CAPITAL COSTS	1.00 EA	0	0	1,206,170	0	1,206,170	1206170
03.06.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	167	6,349	7,106	0	13,455	13454.84
RECONTOUR/BACKFILL	1.00 EA	167	6,349	1,213,275	0	1,219,625	1219625
03.06.02 REVEGETATION							
03.06.03 DEMOBILIZATION							
RECLAMATION	1.00 EA	167	6,349	1,213,275	0	1,219,625	1219625
FY 1998	1.00 EA	221,449	8,674,493	13,918,018	4,751,024	27,343,534	27343534
04 FY 1999							
04.01 PRE-CONSTRUCTION							
04.01.01 PROCUREMENT							
04.01.02 TRAINING							
04.01.02.01 CAPITAL COSTS	1.00 EA	0	0	0	71,940	71,940	71940.00
TRAINING	1.00 EA	0	0	0	71,940	71,940	71940.00
04.01.03 SITE PREPARATION							
04.01.04 SITE MOBILIZATION							
PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00

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		QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
04.02	EXCAVATION/DEMOLITION							
04.02.01	EXCAVATION/DEMOLITION							
04.02.01.01	CAPITAL COSTS	1.00 EA	0	0	3,255,213	21,041	3,276,254	3276254
04.02.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	68,105	2,660,359	1,647,628	0	4,307,988	4307988
	EXCAVATION/DEMOLITION	1.00 EA	68,105	2,660,359	4,902,842	21,041	7,584,242	7584242
	EXCAVATION/DEMOLITION	1.00 EA	68,105	2,660,359	4,902,842	21,041	7,584,242	7584242
04.03	TRANSPORTATION							
04.03.01	RAIL							
04.03.01.01	CAPITAL COSTS	1.00 EA	0	0	518,916	0	518,916	518916.15
04.03.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	16,640	456,602	1,407,408	380,000	2,244,010	2244010
	RAIL	1.00 EA	16,640	456,602	1,926,324	380,000	2,762,926	2762926
04.03.02	ROAD							
04.03.02.01	CAPITAL COSTS	1.00 EA	0	0	1,818,230	72,684	1,890,914	1890914
04.03.02.03	OPERATIONS AND MAINTENANCE	1.00 EA	52,440	2,345,301	2,956,449	0	5,301,750	5301750
	ROAD	1.00 EA	52,440	2,345,301	4,774,679	72,684	7,192,664	7192664
04.03.03	CONTAINERS							
04.03.03.01	CAPITAL COSTS	1.00 EA	0	0	281,134	0	281,134	281134.11
04.03.03.03	OPERATIONS AND MAINTENANCE	1.00 EA	8,320	316,060	1,231,327	0	1,547,387	1547387
	CONTAINERS	1.00 EA	8,320	316,060	1,512,461	0	1,828,521	1828521
	TRANSPORTATION	1.00 EA	77,400	3,117,963	8,213,464	452,684	11,784,111	11784111
04.04	ANCILLARY							
04.04.01	EQUIPMENT DECON FACILITY							
04.04.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	4,160	142,177	0	51,480	193,657	193656.69
	EQUIPMENT DECON FACILITY	1.00 EA	4,160	142,177	0	51,480	193,657	193656.69
04.04.02	SURVEY STATION							

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
04.04.02.03 OPERATIONS AND MAINTENANCE	1.00 EA	33,280	1,618,730	0	0	1,618,730	1618730
SURVEY STATION	1.00 EA	33,280	1,618,730	0	0	1,618,730	1618730
04.04.03 OFFICE AREA							
04.04.03.02 EXPENSES	1.00 EA	0	0	0	33,665	33,665	33665.38
04.04.03.03 OPERATIONS AND MAINTENANCE	1.00 EA	0	0	232,068	300,181	532,249	532248.70
OFFICE AREA	1.00 EA	0	0	232,068	333,847	565,914	565914.08
04.04.04 PERSONNEL DECON/CHANGE AREA							
04.04.04.03 OPERATIONS AND MAINTENANCE	1.00 EA	0	0	0	56,056	56,056	56056.00
PERSONNEL DECON/CHANGE AREA	1.00 EA	0	0	0	56,056	56,056	56056.00
04.04.05 RECEIVING AREA/WAREHOUSE							
04.04.06 UTILITIES							
04.04.06.02 EXPENSES	1.00 EA	0	0	0	2,000	2,000	2000.00
UTILITIES	1.00 EA	0	0	0	2,000	2,000	2000.00
ANCILLARY	1.00 EA	37,440	1,760,907	232,068	443,383	2,436,357	2436357
04.05 SUPPORT							
04.05.01 SUPPORT							
04.05.01.02 EXPENSES	1.00 EA	8,320	200,000	0	3,747,248	3,947,248	3947248
04.05.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	45,760	1,642,342	470,936	14,729	2,128,008	2128008
SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
04.06 RECLAMATION							
04.06.01 RECONTOUR/BACKFILL							
04.06.01.01 CAPITAL COSTS	1.00 EA	0	0	756,821	0	756,821	756820.52
04.06.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	1,083	41,214	46,015	0	87,229	87229.26

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
RECONTOUR/BACKFILL	1.00 EA	1,083	41,214	802,835	0	844,050	844049.78
04.06.02 REVEGETATION							
04.06.03 DECONTAMINATION/DISPOSAL							
RECLAMATION	1.00 EA	1,083	41,214	802,835	0	844,050	844049.78
FY 1999	1.00 EA	238,108	9,422,786	14,622,145	4,751,024	28,795,955	28795955
05 FY 2000							
05.01 PRE-CONSTRUCTION							
05.01.01 PROCUREMENT							
05.01.02 TRAINING							
05.01.02.01 CAPITAL COSTS	1.00 EA	0	0	0	71,940	71,940	71940.00
TRAINING	1.00 EA	0	0	0	71,940	71,940	71940.00
05.01.03 SITE PREPARATION							
05.01.04 SITE MOBILIZATION							
PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
05.02 EXCAVATION/DEMOLITION							
05.02.01 EXCAVATION/DEMOLITION							
05.02.01.01 CAPITAL COSTS	1.00 EA	0	0	2,835,069	21,041	2,856,110	2856110
05.02.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	68,677	2,682,318	1,733,405	0	4,415,723	4415723
EXCAVATION/DEMOLITION	1.00 EA	68,677	2,682,318	4,568,474	21,041	7,271,833	7271833
EXCAVATION/DEMOLITION	1.00 EA	68,677	2,682,318	4,568,474	21,041	7,271,833	7271833
05.03 TRANSPORTATION							
05.03.01 RAIL							

		QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
05.03.01.01	CAPITAL COSTS	1.00 EA	0	0	518,916	0	518,916	518916.15
05.03.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	16,640	456,602	1,407,408	380,000	2,244,010	2244010
	RAIL	1.00 EA	16,640	456,602	1,926,324	380,000	2,762,926	2762926
05.03.02	ROAD							
05.03.02.01	CAPITAL COSTS	1.00 EA	0	0	1,818,230	72,684	1,890,914	1890914
05.03.02.03	OPERATIONS AND MAINTENANCE	1.00 EA	52,906	2,366,691	2,985,607	0	5,352,298	5352298
	ROAD	1.00 EA	52,906	2,366,691	4,803,837	72,684	7,243,211	7243211
05.03.03	CONTAINERS							
05.03.03.01	CAPITAL COSTS	1.00 EA	0	0	281,134	0	281,134	281134.11
05.03.03.03	OPERATIONS AND MAINTENANCE	1.00 EA	8,320	316,060	1,231,327	0	1,547,387	1547387
	CONTAINERS	1.00 EA	8,320	316,060	1,512,461	0	1,828,521	1828521
	TRANSPORTATION	1.00 EA	77,866	3,139,353	8,242,622	452,684	11,834,658	11834658
05.04	ANCILLARY							
05.04.01	EQUIPMENT DECON FACILITY							
05.04.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	4,160	142,177	0	51,480	193,657	193656.69
	EQUIPMENT DECON FACILITY	1.00 EA	4,160	142,177	0	51,480	193,657	193656.69
05.04.02	SURVEY STATION							
05.04.02.03	OPERATIONS AND MAINTENANCE	1.00 EA	33,280	1,618,730	0	0	1,618,730	1618730
	SURVEY STATION	1.00 EA	33,280	1,618,730	0	0	1,618,730	1618730
05.04.03	OFFICE AREA							
05.04.03.02	EXPENSES	1.00 EA	0	0	0	33,665	33,665	33665.38
05.04.03.03	OPERATIONS AND MAINTENANCE	1.00 EA	0	0	232,068	300,181	532,249	532248.70
	OFFICE AREA	1.00 EA	0	0	232,068	333,847	565,914	565914.08
05.04.04	PERSONNEL DECON/CHANGE AREA							
05.04.04.03	OPERATIONS AND MAINTENANCE	1.00 EA	0	0	0	56,056	56,056	56056.00

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
PERSONNEL DECON/CHANGE AREA	1.00 EA	0	0	0	56,056	56,056	56056.00
05.04.05 RECEIVING AREA/WAREHOUSE							
05.04.06 UTILITIES							
05.04.06.02 EXPENSES	1.00 EA	0	0	0	2,000	2,000	2000.00
UTILITIES	1.00 EA	0	0	0	2,000	2,000	2000.00
ANCILLARY	1.00 EA	37,440	1,760,907	232,068	443,383	2,436,357	2436357
05.05 SUPPORT							
05.05.01 SUPPORT							
05.05.01.02 EXPENSES	1.00 EA	8,320	200,000	0	3,747,248	3,947,248	3947248
05.05.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	45,760	1,642,342	470,936	14,729	2,128,008	2128008
SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
SUPPORT	1.00 EA	54,080	1,842,342	470,936	3,761,977	6,075,256	6075256
05.06 RECLAMATION							
05.06.01 RECONTOUR/BACKFILL							
05.06.01.01 CAPITAL COSTS	1.00 EA	0	0	2,245,841	0	2,245,841	2245841
05.06.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	1,069	40,747	48,765	0	89,512	89512.48
RECONTOUR/BACKFILL	1.00 EA	1,069	40,747	2,294,607	0	2,335,354	2335354
05.06.02 REVEGETATION							
05.06.03 DEMOBILIZATION							
RECLAMATION	1.00 EA	1,069	40,747	2,294,607	0	2,335,354	2335354
FY 2000	1.00 EA	239,131	9,465,667	15,808,707	4,751,024	30,025,398	30025398
06 FY 2001							
06.01 PRE-CONSTRUCTION							

	QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
06.01.01 PROCUREMENT							
06.01.02 TRAINING							
06.01.02.01 CAPITAL COSTS	1.00 EA	0	0	0	71,940	71,940	71940.00
TRAINING	1.00 EA	0	0	0	71,940	71,940	71940.00
06.01.03 SITE PREPARATION							
06.01.04 SITE MOBILIZATION							
PRE-CONSTRUCTION	1.00 EA	0	0	0	71,940	71,940	71940.00
06.02 EXCAVATION/DEMOLITION							
06.02.01 EXCAVATION/DEMOLITION							
06.02.01.01 CAPITAL COSTS	1.00 EA	0	0	2,624,478	21,041	2,645,518	2645518
06.02.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	39,285	1,541,233	994,532	0	2,535,765	2535765
EXCAVATION/DEMOLITION	1.00 EA	39,285	1,541,233	3,619,010	21,041	5,181,284	5181284
EXCAVATION/DEMOLITION	1.00 EA	39,285	1,541,233	3,619,010	21,041	5,181,284	5181284
06.03 TRANSPORTATION							
06.03.01 RAIL							
06.03.01.01 CAPITAL COSTS	1.00 EA	0	0	432,430	0	432,430	432430.13
06.03.01.03 OPERATIONS AND MAINTENANCE	1.00 EA	16,640	456,602	1,407,408	380,000	2,244,010	2244010
RAIL	1.00 EA	16,640	456,602	1,839,838	380,000	2,676,440	2676440
06.03.02 ROAD							
06.03.02.01 CAPITAL COSTS	1.00 EA	0	0	1,373,173	72,684	1,445,856	1445856
06.03.02.03 OPERATIONS AND MAINTENANCE	1.00 EA	28,679	1,253,470	1,468,140	0	2,721,610	2721610
ROAD	1.00 EA	28,679	1,253,470	2,841,313	72,684	4,167,467	4167467
06.03.03 CONTAINERS							
06.03.03.01 CAPITAL COSTS	1.00 EA	0	0	234,278	0	234,278	234278.42
06.03.03.03 OPERATIONS AND MAINTENANCE	1.00 EA	4,160	158,030	1,150,135	0	1,308,165	1308165

	QUANTITY	UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
CONTAINERS	1.00	EA	4,160	158,030	1,384,413	0	1,542,443	1542443
TRANSPORTATION	1.00	EA	49,479	1,868,102	6,065,565	452,684	8,386,350	8386350
06.04 ANCILLARY								
06.04.01 EQUIPMENT DECON FACILITY								
06.04.01.03 OPERATIONS AND MAINTENANCE	1.00	EA	4,160	142,177	0	51,480	193,657	193656.69
EQUIPMENT DECON FACILITY	1.00	EA	4,160	142,177	0	51,480	193,657	193656.69
06.04.02 SURVEY STATION								
06.04.02.03 OPERATIONS AND MAINTENANCE	1.00	EA	16,640	809,365	0	0	809,365	809365.17
SURVEY STATION	1.00	EA	16,640	809,365	0	0	809,365	809365.17
06.04.03 OFFICE AREA								
06.04.03.02 EXPENSES	1.00	EA	0	0	0	33,665	33,665	33665.38
06.04.03.03 OPERATIONS AND MAINTENANCE	1.00	EA	0	0	232,068	300,181	532,249	532248.70
OFFICE AREA	1.00	EA	0	0	232,068	333,847	565,914	565914.08
06.04.04 PERSONNEL DECON/CHANGE AREA								
06.04.04.03 OPERATIONS AND MAINTENANCE	1.00	EA	0	0	0	56,056	56,056	56056.00
PERSONNEL DECON/CHANGE AREA	1.00	EA	0	0	0	56,056	56,056	56056.00
06.04.05 RECEIVING AREA/WAREHOUSE								
06.04.06 UTILITIES								
06.04.06.02 EXPENSES	1.00	EA	0	0	0	2,000	2,000	2000.00
UTILITIES	1.00	EA	0	0	0	2,000	2,000	2000.00
ANCILLARY	1.00	EA	20,800	951,542	232,068	443,383	1,626,992	1626992
06.05 SUPPORT								
06.05.01 SUPPORT								

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** PROJECT DIRECT SUMMARY - LEVEL 4 **

		QUANTITY UOM	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST	UNIT COST
06.05.01.02	EXPENSES	1.00 EA	8,320	200,000	0	3,747,248	3,947,248	3947248
06.05.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	37,440	1,355,384	440,101	14,729	1,810,214	1810214
	SUPPORT	1.00 EA	45,760	1,555,384	440,101	3,761,977	5,757,462	5757462
	SUPPORT	1.00 EA	45,760	1,555,384	440,101	3,761,977	5,757,462	5757462
06.06	RECLAMATION							
06.06.01	RECONTOUR/BACKFILL							
06.06.01.01	CAPITAL COSTS	1.00 EA	0	0	2,245,841	0	2,245,841	2245841
06.06.01.03	OPERATIONS AND MAINTENANCE	1.00 EA	11,123	424,434	530,311	0	954,745	954744.81
	RECONTOUR/BACKFILL	1.00 EA	11,123	424,434	2,776,152	0	3,200,586	3200586
06.06.02	REVEGETATION							
06.06.02.01	CAPITAL COSTS	1.00 EA	0	0	0	258,133	258,133	258133.00
	REVEGETATION	1.00 EA	0	0	0	258,133	258,133	258133.00
06.06.03	DEMOBILIZATION							
06.06.03.01	CAPITAL COSTS	1.00 EA	1,891	73,721	2,349	1,362,228	1,438,298	1438298
	DEMOBILIZATION	1.00 EA	1,891	73,721	2,349	1,362,228	1,438,298	1438298
	RECLAMATION	1.00 EA	13,014	498,155	2,778,501	1,620,361	4,897,017	4897017
	FY 2001	1.00 EA	168,338	6,414,415	13,135,244	6,371,385	25,921,045	25921045
	100 B/C AREA REMEDIAL ACTIVITI	1.00 EA	1,023,473	39,992,593	73,425,988	31,170,054	144,588,635	144588635

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

** CONTRACTOR INDIRECT SUMMARY - LEVEL 1 **

	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
01. FY 1996					
CC Capital Costs					
AA Prime Contractor					
SS Structural Steel Sub	1,318,384	0	0	1,594,717	1594717
EL Electrical Sub	203,002	0	0	245,552	245551.56
CO Concrete Sub	17,964	0	0	21,730	21729.62
UT Utilities Sub	163,085	0	0	197,268	197268.21
TA Trucking	90,272	0	0	109,193	109193.01
Subtotal Subcontract Work	1,792,708	0	0	2,168,459	2168459
Indirect on Subcontracts	2,168,459	158,298	593,323	2,920,080	2920080
Indirect on Own Work	10,506,943	767,007	2,874,857	14,148,807	14148807
AA Prime Contractor	12,675,402	925,304	3,468,180	17,068,887	17068887
Subtotal Subcontract Work	12,675,402	925,304	3,468,180	17,068,887	17068887
Indirect on Subcontracts	17,068,887	0	0	17,068,887	17068887
Indirect on Own Work	506,868	0	0	506,868	506867.80
CC Capital Costs	17,575,754	0	0	17,575,754	17575754
EP Expenses					
AB Prime Contractor					
FC Fencing Subcontractor	159,170	0	0	192,532	192532.19
Subtotal Subcontract Work	159,170	0	0	192,532	192532.19
Indirect on Subcontracts	192,532	14,055	52,680	259,267	259266.74
Indirect on Own Work	126,328	9,222	34,565	170,116	170115.62
AB Prime Contractor	318,861	23,277	87,245	429,382	429382.36
Subtotal Subcontract Work	318,861	23,277	87,245	429,382	429382.36
Indirect on Subcontracts	429,382	0	0	429,382	429382.36
Indirect on Own Work	27,000	0	0	27,000	27000.00
EP Expenses	456,382	0	0	456,382	456382.36
OM Operations and Maintenance					
AC Prime Contractor	6,667	487	1,824	8,977	8977.21
Subtotal Subcontract Work	6,667	487	1,824	8,977	8977.21
Indirect on Subcontracts	8,977	0	0	8,977	8977.21
Indirect on Own Work	14,729	0	0	14,729	14729.00
OM Operations and Maintenance	23,706	0	0	23,706	23706.21

02. FY 1997

	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
CC Capital Costs					
AA Prime Contractor	2,952,258	215,515	807,782	3,975,555	3975555
Subtotal Subcontract Work	2,952,258	215,515	807,782	3,975,555	3975555
Indirect on Subcontracts	3,975,555	0	0	3,975,555	3975555
Indirect on Own Work	71,940	0	0	71,940	71940.00
CC Capital Costs	4,047,495	0	0	4,047,495	4047495
EP Expenses					
AB Prime Contractor	787,000	57,451	215,335	1,059,786	1059786
Subtotal Subcontract Work	787,000	57,451	215,335	1,059,786	1059786
Indirect on Subcontracts	1,059,786	0	0	1,059,786	1059786
Indirect on Own Work	1,217,682	0	0	1,217,682	1217682
EP Expenses	2,277,468	0	0	2,277,468	2277468
OM Operations and Maintenance					
AC Prime Contractor					
TR Trucking Subcontractor	583,907	0	0	706,294	706294.47
Subtotal Subcontract Work	583,907	0	0	706,294	706294.47
Indirect on Subcontracts	706,294	51,559	193,253	951,107	951106.73
Indirect on Own Work	3,508,259	256,103	959,912	4,724,274	4724274
AC Prime Contractor	4,214,553	307,662	1,153,165	5,675,380	5675380
Subtotal Subcontract Work	4,214,553	307,662	1,153,165	5,675,380	5675380
Indirect on Subcontracts	5,675,380	0	0	5,675,380	5675380
Indirect on Own Work	2,446,519	0	0	2,446,519	2446519
OM Operations and Maintenance	8,121,899	0	0	8,121,899	8121899
03. FY 1998					
CC Capital Costs					
AA Prime Contractor	5,098,281	372,175	1,394,966	6,865,422	6865422
Subtotal Subcontract Work	5,098,281	372,175	1,394,966	6,865,422	6865422
Indirect on Subcontracts	6,865,422	0	0	6,865,422	6865422
Indirect on Own Work	71,940	0	0	71,940	71940.00
CC Capital Costs	6,937,362	0	0	6,937,362	6937362
EP Expenses					
AB Prime Contractor	1,485,400	108,434	406,428	2,000,262	2000262
Subtotal Subcontract Work	1,485,400	108,434	406,428	2,000,262	2000262

** CONTRACTOR INDIRECT SUMMARY - LEVEL 1 **

	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
Indirect on Subcontracts	2,000,262	0	0	2,000,262	2000262
Indirect on Own Work	1,982,651	0	0	1,982,651	1982651
EP Expenses	3,982,913	0	0	3,982,913	3982913
OM Operations and Maintenance					
AC Prime Contractor					
TR Trucking Subcontractor	1,975,349	0	0	2,389,382	2389382
Subtotal Subcontract Work	1,975,349	0	0	2,389,382	2389382
Indirect on Subcontracts	2,389,382	174,425	653,771	3,217,577	3217577
Indirect on Own Work	7,654,124	558,751	2,094,283	10,307,158	10307158
AC Prime Contractor	10,043,506	733,176	2,748,054	13,524,736	13524736
Subtotal Subcontract Work	10,043,506	733,176	2,748,054	13,524,736	13524736
Indirect on Subcontracts	13,524,736	0	0	13,524,736	13524736
Indirect on Own Work	2,898,523	0	0	2,898,523	2898523
OM Operations and Maintenance	16,423,259	0	0	16,423,259	16423259
04. FY 1999					
CC Capital Costs					
AA Prime Contractor	4,993,289	364,510	1,366,239	6,724,038	6724038
Subtotal Subcontract Work	4,993,289	364,510	1,366,239	6,724,038	6724038
Indirect on Subcontracts	6,724,038	0	0	6,724,038	6724038
Indirect on Own Work	71,940	0	0	71,940	71940.00
CC Capital Costs	6,795,978	0	0	6,795,978	6795978
EP Expenses					
AB Prime Contractor	1,485,400	108,434	406,428	2,000,262	2000262
Subtotal Subcontract Work	1,485,400	108,434	406,428	2,000,262	2000262
Indirect on Subcontracts	2,000,262	0	0	2,000,262	2000262
Indirect on Own Work	1,982,651	0	0	1,982,651	1982651
EP Expenses	3,982,913	0	0	3,982,913	3982913
OM Operations and Maintenance					
AC Prime Contractor					
TR Trucking Subcontractor	2,941,226	0	0	3,557,707	3557707
Subtotal Subcontract Work	2,941,226	0	0	3,557,707	3557707
Indirect on Subcontracts	3,557,707	259,713	973,442	4,790,862	4790862
Indirect on Own Work	7,669,362	559,863	2,098,453	10,327,678	10327678

** CONTRACTOR INDIRECT SUMMARY - LEVEL 1 **

	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
AC Prime Contractor	11,227,069	819,576	3,071,895	15,118,540	15118540
Subtotal Subcontract Work	11,227,069	819,576	3,071,895	15,118,540	15118540
Indirect on Subcontracts	15,118,540	0	0	15,118,540	15118540
Indirect on Own Work	2,898,523	0	0	2,898,523	2898523
OM Operations and Maintenance	18,017,063	0	0	18,017,063	18017063
05. FY 2000					
CC Capital Costs					
AA Prime Contractor	5,787,040	422,454	1,583,421	7,792,915	7792915
Subtotal Subcontract Work	5,787,040	422,454	1,583,421	7,792,915	7792915
Indirect on Subcontracts	7,792,915	0	0	7,792,915	7792915
Indirect on Own Work	71,940	0	0	71,940	71940.00
CC Capital Costs	7,864,855	0	0	7,864,855	7864855
EP Expenses					
AB Prime Contractor	1,485,400	108,434	406,428	2,000,262	2000262
Subtotal Subcontract Work	1,485,400	108,434	406,428	2,000,262	2000262
Indirect on Subcontracts	2,000,262	0	0	2,000,262	2000262
Indirect on Own Work	1,982,651	0	0	1,982,651	1982651
EP Expenses	3,982,913	0	0	3,982,913	3982913
OM Operations and Maintenance					
AC Prime Contractor					
TR Trucking Subcontractor	2,972,259	0	0	3,595,244	3595244
Subtotal Subcontract Work	2,972,259	0	0	3,595,244	3595244
Indirect on Subcontracts	3,595,244	262,453	983,713	4,841,409	4841409
Indirect on Own Work	7,751,062	565,828	2,120,807	10,437,697	10437697
AC Prime Contractor	11,346,306	828,280	3,104,520	15,279,106	15279106
Subtotal Subcontract Work	11,346,306	828,280	3,104,520	15,279,106	15279106
Indirect on Subcontracts	15,279,106	0	0	15,279,106	15279106
Indirect on Own Work	2,898,523	0	0	2,898,523	2898523
OM Operations and Maintenance	18,177,629	0	0	18,177,629	18177629

06. FY 2001
CC Capital Costs

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** CONTRACTOR INDIRECT SUMMARY - LEVEL 1 **

	DIRECT	MPR	G&A+ CSP	TOTAL COST	UNIT COST
AA Prime Contractor					
SS Structural Steel Sub	36,773	0	0	44,480	44480.37
Subtotal Subcontract Work	36,773	0	0	44,480	44480.37
Indirect on Subcontracts	44,480	3,247	12,170	59,898	59897.94
Indirect on Own Work	6,224,737	454,406	1,703,182	8,382,325	8382325
AA Prime Contractor	6,269,218	457,653	1,715,352	8,442,223	8442223
Subtotal Subcontract Work	6,269,218	457,653	1,715,352	8,442,223	8442223
Indirect on Subcontracts	8,442,223	0	0	8,442,223	8442223
Indirect on Own Work	330,073	0	0	330,073	330073.00
CC Capital Costs	8,772,296	.0	0	8,772,296	8772296
EP Expenses					
AB Prime Contractor	1,485,400	108,434	406,428	2,000,262	2000262
Subtotal Subcontract Work	1,485,400	108,434	406,428	2,000,262	2000262
Indirect on Subcontracts	2,000,262	0	0	2,000,262	2000262
Indirect on Own Work	1,982,651	0	0	1,982,651	1982651
EP Expenses	3,982,913	0	0	3,982,913	3982913
OM Operations and Maintenance					
AC Prime Contractor					
TR Trucking Subcontractor	1,357,216	0	0	1,641,688	1641688
Subtotal Subcontract Work	1,357,216	0	0	1,641,688	1641688
Indirect on Subcontracts	1,641,688	119,843	449,191	2,210,722	2210722
Indirect on Own Work	5,982,846	436,748	1,636,996	8,056,590	8056590
AC Prime Contractor	7,624,535	556,591	2,086,187	10,267,313	10267313
Subtotal Subcontract Work	7,624,535	556,591	2,086,187	10,267,313	10267313
Indirect on Subcontracts	10,267,313	0	0	10,267,313	10267313
Indirect on Own Work	2,898,523	0	0	2,898,523	2898523
OM Operations and Maintenance	13,165,836	0	0	13,165,836	13165836

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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DETAILED ESTIMATE 100 B/C LSR DETAIL PAGE 1
01. FY 1996

01.01. PRE-CONSTRUCTION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
01. FY 1996							
01.01. PRE-CONSTRUCTION							
01.01.01. PROCUREMENT							
01.01.01.01. CAPITAL COSTS							
01.01.01.02. EXPENSES							
01.01.01.03. OPERATIONS AND MAINTENANCE							
01.01.02. TRAINING							
01.01.02.01. CAPITAL COSTS							
USR CC 40 hr Hazardous Waste Training			0.00	0.00	0.00	855.00	855.00
	218.00 EA		0	0	0	186,390	186,390
USR CC 40 hr Radiological Worker Trng			0.00	0.00	0.00	520.00	520.00
	218.00 EA		0	0	0	113,360	113,360
USR AA Excavation dust suppression			4.00	111.36	0.00	0.00	111.36
1 crew for 2 shift = 2 crews at 80 hrs ea = 160 hrs.	160.00 HR		640	23,993	0	0	23,993
USR AA E-1 crew standby			3.50	103.68	0.00	0.00	103.68
1 crew for 2 shift = 2 crews at 80 hrs ea = 160 hr.	160.00 HR	JEXSB1	560	22,339	0	0	22,339
USR AA E-2 crew standby			4.50	131.83	0.00	0.00	131.83
1 crew for 2 shifts = 2 crews for 80 hrs ea. = 160 hrs.	160.00 HR	JEXSB2	720	28,404	0	0	28,404
USR AA E-3 crew standby			3.50	103.68	0.00	0.00	103.68
1 crew for 2 shift = 2 crews for 80 hrs ea. = 160 hrs.	160.00 HR	JEXSB3	560	22,339	0	0	22,339
USR AA E-4 crew standby			3.50	103.68	0.00	0.00	103.68
1 crew for 2 shift = 2 crews for 80 hrs ea = 160 hrs.	160.00 HR	JEXSB4	560	22,339	0	0	22,339
USR AA Lid replacement/removal			1.00	23.00	0.00	0.00	23.00
1 crew for 2 shifts = 2 crews for 80 hrs ea. = 160 hrs.	160.00 HR		160	4,956	0	0	4,956
USR AA Classification operating crew			2.00	50.16	0.00	0.00	50.16
1 crew for 2 shift = 2 crews for 80 hrs ea = 160 hrs.	160.00 HR	JMSCL9	320	10,807	0	0	10,807

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

Thu 25 Nov 1993 IT CORPORATION TIME 09:10:29
PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
DETAILED ESTIMATE 100 B/C LSR DETAIL PAGE 2
01. FY 1996

01.01. PRE-CONSTRUCTION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA Spoil Pile Management		1.00	24.32	0.00	0.00	24.32
2 crews for 2 shift = 4 crews for 80 hrs ea. = 320 hrs.	320.00 HR	320	10,480	0	0	10,480
USR AA Frisking station		4.00	144.48	0.00	0.00	144.48
2 crew for 2 shifts = 2 crews for 80 hrs ea. = 320 hrs.	320.00 HR JFRSK1	1,280	62,259	0	0	62,259
USR AA Container Transfer		2.00	47.30	0.00	0.00	47.30
1 crew for 2 shifts = 2 crews for 80 hrs ea. = 160 hrs.	160.00 HR	320	10,191	0	0	10,191
USR AA Equipment Decon Operations		1.00	25.38	0.00	0.00	25.38
1 crew for 2 shifts = 2 crews for 80 hrs ea. = 160 hrs.	160.00 HR JMSCL11	160	5,468	0	0	5,468
USR AA Backfill/Regrading		8.00	184.67	0.00	5.29	189.96
1 crew for 2 shifts = 2 crews for 80 hrs ea. = 160 hrs.	160.00 HR	1,280	39,789	0	1,140	40,928
MIL AA Area Supervisors		0.00	0.00	0.00	5000.00	5000.00
5 area supervisors/shift * 2 shifts/day = 10 supervisors for 80 hrs ea = 800 hrs * 1 mo/320 hrs. = 2.5 mo.	2.50 MON N/A	0	0	0	16,833	16,833
MIL AA Clerks		0.00	0.00	0.00	1700.00	1700.00
1 clerk for 2 shifts = 2 clerks at 80 hrs ea = 160 hrs * 1 mo/320 hrs = 0.5 mo	0.50 MON N/A	0	0	0	1,145	1,145
MIL AA Network Administrator		0.00	0.00	0.00	4200.00	4200.00
1 Administrator for 2 shifts = 2 Administratrors for 80 hrs ea. = 160 hrs * 1 mo/320 hrs = 0.5 mo	0.50 MON N/A	0	0	0	2,828	2,828
MIL AA Project Engineer		0.00	0.00	0.00	4700.00	4700.00
5 engineers for 2 shifts = 10 engineers for 80 hrs ea = 800 hrs. * 1 mo/320 hrs = 2.5 mo	2.50 MON N/A	0	0	0	15,823	15,823
MIL AA Site Safety and QA		0.00	0.00	0.00	3800.00	3800.00
1 engineer for 2 shifts = 2 engineers for 80 hrs each = 160 hrs * 1 mo/320 hrs = 0.5 mo.	0.50 MON N/A	0	0	0	2,559	2,559
USR AA Road crew operations		2.00	47.89	0.00	0.00	47.89
1 crew for 2 shifts = 2 crews for 80 hrs ea = 160 hrs.	160.00 HR	320	10,318	0	0	10,318

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

DETAILED ESTIMATE | 100 B/C LSR | DETAIL PAGE 3

.01. FY 1996

01.01. PRE-CONSTRUCTION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA Offshift operations			8.00	203.58	0.00	0.00	203.58
1 crew for 1 shift = 80 hrs.	80.00 HR		640	21,932	0	0	21,932
USR AA Miscellaneous Laborers (Gophers)			3.00	65.01	0.00	0.00	65.01
1 crew for 2 shifts = 2 crews for 80 hrs ea = 160 hrs.	160.00 HR		480	14,007	0	0	14,007
USR TA Truck operations standby			1.00	28.21	0.00	0.00	28.21
20 drivers for 2 shift = 40 drivers for 80 hrs ea = 3200 hrs.	3200.00 HR	JTRNS2	3,200	147,041	0	0	147,041
USR AA Locomotive operations			4.00	93.45	0.00	0.00	93.45
1 crew for 2 shifts = 2 crews for 80 hrs ea. = 160 hrs.	160.00 HR		640	20,135	0	0	20,135
USR AA Vehicle Maintenance			1.00	28.14	0.00	0.00	28.14
8 mechanics for 3 shift = 24 mehcanics for 80 hrs ea = 1920 hrs.	1920.00 HR	JMOBDM88	1,920	72,756	0	0	72,756
USR CC Medic support			2.00	48.08	0.00	0.00	48.08
2 medics for 2 shifts = 2 crews for 80 hrs ea = 160 hrs	160.00 HR		320	7,693	0	0	7,693
USR AA Sample Transport			1.00	24.99	3.18	0.00	28.17
1 crew for 2 shifts = 2 crews for 80 hrs ea = 160 hrs.	160.00 HR	JMSCL6	160	5,384	685	0	6,070
USR AA E-5 crew standby			3.50	103.68	0.00	0.00	103.68
1 crew for 2 shifts = 2 crews at 80 hrs ea = 160 hrs.	160.00 HR	JEXSB5	560	22,339	0	0	22,339
01.01.02.02. EXPENSES							
01.01.02.03. OPERATIONS AND MAINTENANCE							
01.01.03. SITE PREPARATION							
01.01.03.01. CAPITAL COSTS							
USR AA Clearing and Grubbing			68.97	1788.39	589.10	0.00	2377.49
581,351 sy = 120.1 acres. Includes all clearing and grubbing for the site.	120.10 ACR	JMSCL3	8,283	289,234	95,274	0	384,508
USR CO Concrete Formwork			0.10	2.98	0.06	1.11	4.15
Footing for Classification structure.	1024.00 SF	JMOBDM81	107	4,965	102	1,851	6,918

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

01.01. PRE-CONSTRUCTION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR CO Concrete Reinforcing		11.43	358.00	2.70	368.00	728.70
Footings for Classification Structure.	3.14 TON JMOBDMB2	36	1,831	14	1,882	3,727
USR CO Concrete Placement		0.87	22.59	0.79	47.15	70.54
Footings for Classification Structure.	38.00 CY JMOBDMB3	33	1,398	49	2,918	4,366
USR SS Structural Steel		7.11	207.16	50.70	1850.00	2107.85
Erection of structural steel for the Classification Structure.	3.60 TON JMOBDMB4	26	1,215	297	10,848	12,360
USR SS Metal Joists/Trusses		6.67	187.61	36.20	700.00	923.81
Ceiling structure for the classification structure.	8.60 TON JMOBDMB5	57	2,628	507	9,806	12,941
USR SS Handrail		0.44	13.19	0.78	30.00	43.98
Handrail for classification structure.	128.00 LF JMOBDMB7	57	2,751	163	6,255	9,169
M USR SS Metal Decking		0.01	0.24	0.01	0.76	1.01
Decking for Classification structure.	309.00 SF JMOBDMB6	3	123	4	383	509
USR AA Erected Metal Bldng (18'eave)		0.00	0.00	0.00	13.65	13.65
65'x30' building for Equip decon station. Metal Building, 18' eave height, 26 Ga walls & roof. Live load 20 lb/sf, wind load 20 lb/sf. Prepainted Steel wall panels 26 Ga. Standing Seam Roof Panels roof 1 in 2 slope, Standard bay spacing, Window and door framing.	1950.00 SF	0	0	0	35,844	35,844
USR AA Erected Metal Bldng (30'eave)		0.00	0.00	0.00	22.76	22.76
50'x40' for classification structure. 26 Ga walls & roof. Live load 20 lb/sf, wind load 20 lb/sf. Prepainted steel wall panels 26 Ga, standing seam roof panels, roof 1 in 2 slope, standard bay spacing, window and door framing.	2000.00 SF	0	0	0	61,298	61,298
USR AA Lean To's		0.00	0.00	0.00	7.59	7.59
2 @ 20'x8' for the frisking station.	320.00 SF	0	0	0	3,271	3,271

01.01. PRE-CONSTRUCTION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
01.01.03.02. EXPENSES						
USR FC Top rail including tie wires		0.03	0.63	0.11	0.41	1.15
Installation of perimeter fence. Work will be performed by a fencing subcontractor.	13565 LF JMSCL1	339	13,946	2,418	9,059	25,423
USR FC Galv barbed wire, per strand		0.01	0.25	0.04	0.03	0.33
Installation of perimeter fence. Work will be performed by a fencing subcontractor.	41535 LF JMSCL1	415	17,081	2,962	2,030	22,072
USR FC 8' fabric chain link		0.10	2.52	0.44	2.42	5.38
Installation of perimeter fence. Work will be performed by a fencing subcontractor.	13845 LF JMSCL1	1,385	56,935	9,872	54,575	121,382
USR FC Galv stl corner post, 8' hgt		0.50	12.62	2.19	38.68	53.49
Installation of perimeter fence. Work will be performed by a fencing subcontractor.	8.00 EA JMSCL1	4	164	29	504	697
USR FC Galv end/gate post, 8' fence hgt		0.50	12.62	2.19	18.84	33.65
Installation of perimeter fence. Work will be performed by a fencing subcontractor.	14.00 EA JMSCL1	7	288	50	430	767
USR FC Galv stl line post, 8' fence hgt		0.43	10.82	1.88	6.38	19.08
Installation of perimeter fence. Work will be performed by a fencing subcontractor.	1385.00 EA JMSCL1	594	24,410	4,232	14,393	43,035
USR FC 8' sliding gate		1.33	34.57	14.15	51.90	100.62
Installation of perimeter fence. Work will be performed by a fencing subcontractor.	280.00 LF JMSCL2	373	15,765	6,454	23,671	45,890
USR AB Site Prep for Fuel Tank w/ E1		0.01	0.41	0.17	0.00	0.59
E1 crew consists of: 1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic Excavator Production Rate = 381 cy/hr Excavation of twice the volume of the tank for spillage control.	396.00 CY JEXC1	6	221	92	0	312

01.01. PRE-CONSTRUCTION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AB 40,000 gal Fuel Storage Tank			86.00	2464.68	208.64	59823.00	62496.32
Based on quote from Ace Tank and Equipment.	1.00 EA	JULITY3	86	3,319	281	80,559	84,158
01.01.03.03. OPERATIONS AND MAINTENANCE							
01.01.04. SITE MOBILIZATION							
01.01.04.01. CAPITAL COSTS							
USR AA Equipment Mobilization			1.00	28.14	0.00	592.04	620.18
Includes costs for equipment erection and sales taxes of 7.8%.	3362.00 EA	JMOBDM88	3,362	127,399	0	2,680,354	2,807,753
01.01.04.02. EXPENSES							
01.01.04.03. OPERATIONS AND MAINTENANCE							
PRE-CONSTRUCTION			30,292	1,148,639	123,485	3,340,006	4,612,131
01.02. EXCAVATION/DEMOLITION							
01.02.01. EXCAVATION/DEMOLITION							
01.02.01.01. CAPITAL COSTS							
USR AA 150,000 lb excavator			0.00	0.00	14214.87	0.00	14214.87
2 excavators for 2 month each. Based on a 5 yr lease purchase option. Price quote from Western States Caterpillar.	4.00 MO		0	0	76,568	0	76,568
USR AA 520 hp dozer			0.00	0.00	13326.49	0.00	13326.49
1 dozer for excavation and 2 for stockpile management. 2 month each. Based on a 5 yr lease purchase option. Price quote from Western States Caterpillar.	6.00 MO		0	0	107,674	0	107,674
USR AA 375 hp front end loader			0.00	0.00	9783.78	0.00	9783.78
1 loader for 2 month. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	2.00 MO		0	0	26,350	0	26,350
USR AA Grapples			0.00	0.00	34800.00	0.00	34800.00
$34,800 for grapples based on quote from LaBounty.	1.00 EA		0	0	46,862	0	46,862

01.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA Universal Processor		0.00	0.00	235920.00	0.00	235920.00
$88,920 for processor, $39,600 for pulverizer, $39,600 for the cracker, $62,040 for the shear jaws, and $5,760 for rotation kit = $235,920. Based on quote from LaBounty.	1.00 EA	0	0	317,693	0	317,693
USR AA 8,000 gal water tank		0.00	0.00	35082.00	0.00	35082.00
One for each active spoil pile. Based on price taken from the MCACES database.	5.00 EA	0	0	236,210	0	236,210
USR AA 5,000 gal water truck		0.00	0.00	167000.00	0.00	167000.00
One for each active excavation. Based on price taken from the. MCACES database.	4.00 EA	0	0	899,539	0	899,539
USR AA Hydraulic Hammer		0.00	0.00	123720.00	0.00	123720.00
$113,340 for hammer and $10,380 for attaching kit = $123,720. Based on quote from LaBounty.	1.00 EA	0	0	166,603	0	166,603
01.02.01.02. EXPENSES						
01.02.01.03. OPERATIONS AND MAINTENANCE						
EXCAVATION/DEMOLITION		0	0	1,877,499	0	1,877,499
01.03. TRANSPORTATION						
01.03.01. RAIL						
01.03.01.01. CAPITAL COSTS						
USR AA Locomotives		0.00	0.00	16056.19	0.00	16056.19
2 locomotives for 2 months each. Based on a 5 yr lease purchase option. Price quote from Morrison Knudsen Locomotive division for a refurbished locomotive.	4.00 MO	0	0	86,486	0	86,486
USR CC Railroad track upgrade		0.00	0.00	199425.00	0.00	199425.00
Includes all upgrades from the 100 B/C railhead to the Audrey switch. Will be a service provided by WHC.	1.00 EA	0	0	199,425	0	199,425

01.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR SS Rail Car Assembly			6.00	158.56	78.70	21149.00	21386.26
Includes costs for materials and placement of steel deck and angles on railcar. Work will be performed by a Structural Steel subcontractor.	60.00 EA	JSTL1	360	15,496	7,692	2,066,933	2,090,121
USR SS Rail Car Welding			0.02	0.46	0.05	0.34	0.84
Welding required for railcar upgrades. Work will be performed by a Structural Steel subcontractor.	16260 LF	JSTL2	271	12,113	1,252	9,005	22,370
01.03.01.02. EXPENSES							
01.03.01.03. OPERATIONS AND MAINTENANCE							
01.03.02. ROAD							
01.03.02.01. CAPITAL COSTS							
USR AA Trucks			0.00	0.00	4102.72	0.00	4102.72
20 trucks for 2 months each. Based on a 5 yr lease purchase option. Purchase price quote from Kenworth.	40.00 MO		0	0	220,991	0	220,991
USR AA Trailers			0.00	0.00	995.89	0.00	995.89
20 trailers for 2 months each. Based on 5 yr lease purchase option. Purchase price quote from Red River Trailers.	40.00 MO		0	0	53,643	0	53,643
USR AA 275 hp motor grader			0.00	0.00	7969.35	0.00	7969.35
1 motor grader for 12 months. Based on a 5 yr lease purchase option. Purchase price quote from Western States Caterpillar.	12.00 MO		0	0	128,780	0	128,780
USR AA 12 person vans (prsnl trnsprt)			0.00	0.00	16949.00	0.00	16949.00
Based on a quote from Russ Dean Ford.	17.00 EA		0	0	388,004	0	388,004
USR AA 1/2 ton pickups (prsnl trnsprt)			0.00	0.00	11964.00	0.00	11964.00
Based on a quote from Russ Dean Ford.	13.00 EA		0	0	209,442	0	209,442

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
DETAILED ESTIMATE 100 B/C LSR DETAIL PAGE 3
01. FY 1996

01.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA 10" base course			0.06	1.74	1.05	4.60	7.39
Material prices based on $12.50 per cy for gravel = $3.47/sy and $1.125/sy for soil cement.	133850 CY	JMSCL5	8,566	312,789	189,831	829,124	1,331,744
USR AA Prepare and roll subbase w/o ss			0.03	0.88	0.40	0.00	1.28
Without soil sement for road subbase preparation.	133850 SY	JMSCL4	4,283	158,865	72,242	0	231,107
USR AA Road cut and fill operation			0.01	0.17	0.24	0.00	0.41
Operations to bring existing grade to that required for roads and all areas needing a level surface.	43598 CY	JMSCL14	260	10,121	14,000	0	24,121
USR AA Prepare and roll subbase w ss			0.03	0.88	0.40	1.13	2.41
With soil sement for office area and other areas which need to have compacted surfaces. Material based on $1.125/sy for soil sement.	317866 SY	JMSCL4	10,172	377,272	171,560	483,689	1,032,520
USR AA 5,000 gal water truck			0.00	0.00	166844.00	0.00	166844.00
Price taken from the MCACES database.	1.00 EA		0	0	224,675	0	224,675
USR AA 84" Wide Vibratory Roller			0.00	0.00	2577.00	0.00	2577.00
1 roller for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar	12.00 MO		0	0	41,643	0	41,643
01.03.02.02. EXPENSES							
01.03.02.03. OPERATIONS AND MAINTENANCE							
01.03.03. CONTAINERS							
01.03.03.01. CAPITAL COSTS							
USR AA Containers			0.00	0.00	8510.00	0.00	8510.00
Based on a quote from May Fabricating Corp. Includes both container and lid.	130.00 EA		0	0	1,489,760	0	1,489,760
USR AA Container handlers			0.00	0.00	8698.79	0.00	8698.79
2 handlers for 2 months each. Based on a 5 yr lease purchase option. Price quote from Washington Liftruck.	4.00 MO		0	0	46,856	0	46,856

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

01.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
01.03.03.02. EXPENSES							
01.03.03.03. OPERATIONS AND MAINTENANCE							
TRANSPORTATION			23,912	886,655	3,546,281	3,388,751	7,821,687
01.04. ANCILLARY							
01.04.01. EQUIPMENT DECON FACILITY							
01.04.01.01. CAPITAL COSTS							
USR AA Equipment Decontamination			0.00	0.00	431000.00	0.00	431000.00
Includes Construction costs.	1.00 EA		0	0	580,391	0	580,391
Based on a quote from Hudson.							
USR AA Vacuum Truck for Equip Decon			0.00	0.00	175000.00	0.00	175000.00
Based on a quote from Big Sky	1.00 EA		0	0	235,658	0	235,658
Industries.							
USR UT Holding Tank Installation (40K)			86.00	2464.68	208.64	33141.00	35814.32
2 holding tanks for storage of water from the decon facility for use as either recycle water or dust suppression. Based on crews and prices taken from the MCACES database. Assume this work will be done by a utilities subcontractor.	2.00 EA	JULITY3	172	8,029	680	107,964	116,673
USR UT Pump Installation 100 GPM			12.50	367.07	5.00	1835.00	2207.07
Pump needed to pump water from the holding tanks to the dust suppression vehicles. Based on crews and prices taken from the MCACES database. Assume the work will be done by a utilities subcontractor.	2.00 EA	JULITY6	25	1,196	16	5,978	7,190
USR CO Concrete Formwork			0.10	2.98	0.06	1.11	4.15
Concrete pad for Manual system. Based on crews and prices taken from the MCACES database. Assume this work will be done by a concrete subcontractor.	168.00 SF	JMOBDM81	18	815	17	304	1,135
USR CO Concrete Reinforcing			11.43	358.00	2.70	368.00	728.70
Pad for manual decon system. Based on crews and prices taken from the MCACES database.	5.89 TON	JMOBDM82	67	3,435	26	3,531	6,991

01.04. ANCILLARY	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
Assume this work will be done by a concrete subcontractor.							
USR CO Concrete Placement			0.87	22.59	0.79	47.15	70.54
Pad for manual decon system. Based on crews and prices taken from the MCACES database. Assume this work will be done by a concrete subcontractor.	53.30 CY	JM0BDM83	47	1,961	69	4,093	6,124
USR AA Manual Equipment Decontamination			0.00	0.00	4795.00	0.00	4795.00
Based on a quote from Hotsy corporation.	1.00 EA		0	0	6,457	0	6,457
01.04.01.02. EXPENSES							
01.04.01.03. OPERATIONS AND MAINTENANCE							
01.04.02. SURVEY STATION							
01.04.02.01. CAPITAL COSTS							
01.04.02.02. EXPENSES							
01.04.02.03. OPERATIONS AND MAINTENANCE							
01.04.03. OFFICE AREA							
01.04.03.01. CAPITAL COSTS							
USR AA Change trailer (Female)			0.00	0.00	79800.00	0.00	79800.00
Based on a 14'x60' trailer at $95 per sf. 840 sf * $95/sf = $79800. Price quote from GELCO.	1.00 EA		0	0	107,460	0	107,460
USR AA 24'x48' Office trailer			0.00	0.00	46080.00	0.00	46080.00
1152 sf @ $40/sf = 46,080. Price quote from GELCO.	1.00 EA		0	0	62,052	0	62,052
USR AA 42'x70' Office trailer			0.00	0.00	117600.00	0.00	117600.00
	1.00 EA		0	0	158,362	0	158,362
USR AA Lunchroom Trailer			0.00	0.00	67200.00	0.00	67200.00
28'x60'= 1680 sf @ $40/sf = $67,200. Price quote from GELCO.	1.00 EA		0	0	90,493	0	90,493
USR AA Change trailer (Male)			0.00	0.00	159600.00	0.00	159600.00
Based on a 28'x60' trailer @ $95/sf.	1.00 EA		0	0	214,920	0	214,920

01.04. ANCILLARY	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
1680 sf * $95/sf = 159,600							
01.04.03.02. EXPENSES							
01.04.03.03. OPERATIONS AND MAINTENANCE							
01.04.04. PERSONNEL DECONTAMINATION							
01.04.04.01. CAPITAL COSTS							
USR AA Personnel decon trailers			0.00	0.00	74480.00	0.00	74480.00
Based on 14'x56' trailer at $95 per sf. 784 sf * $95/sf = $74,480. Price quote from GELCO.	2.00 EA		0	0	200,592	0	200,592
USR AA Water tank (wheel mntd)			0.00	0.00	34004.00	0.00	34004.00
8,000 gallon water tank for the west decon trailer used to supply potable water. Prices taken from the MCACES database.	1.00 EA		0	0	45,790	0	45,790
01.04.04.02. EXPENSES							
01.04.04.03. OPERATIONS AND MAINTENANCE							
01.04.05. RECEIVING AREA/WAREHOUSE							
01.04.05.01. CAPITAL COSTS							
01.04.05.02. EXPENSES							
01.04.05.03. OPERATIONS AND MAINTENANCE							
01.04.06. UTILITIES							
01.04.06.01. CAPITAL COSTS							
USR UT Excavation for pipelines			0.04	0.98	0.36	0.00	1.33
8" PVC - 1'x4'x610' = 90.3 cy 3" CI - 1'x4'x360' = 53.3 cy 1" PVC - 1'x4'x1017'= 150.7cy ------- 297 cy Based on crews and prices taken from the MCACES database. Assume this work will be done by a utilities contractor.	297.00 CY	JULITY1	11	472	172	0	644

01.04. ANCILLARY	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR UT Pipe Installation, 8" PVC			0.16	4.41	0.50	3.75	8.66
Based on crews and prices taken from the MCACES database. Assume this work will be done by a utilities subcontractor.	610.00 LF	JULITY2	98	4,387	493	3,726	8,606
USR UT Holding Tank Installation (15K)			34.40	985.87	83.45	8136.00	9205.33
Holding tank for the sanitary effluent system. Based on crews and prices taken from the MCACES database. Assume this work will be done by a utilities subcontractor.	1.00 EA	JULITY3	34	1,606	136	13,252	14,994
USR UT Sump Installation			1.63	42.74	6.28	38.00	87.02
Sump for the sanitary effluent system. Based on crews and prices taken from the MCACES database. Assume this work will be done by a utilities subcontractor.	90.00 VLF	JULITY4	146	6,265	921	5,571	12,757
USR UT Pump Installation			12.50	367.07	5.00	298.10	670.17
2 per sump for the sanitary effluent system. Based on crews and prices taken from the MCACES database. Assume this work will be done by a utilities subcontractor.	4.00 EA	JULITY6	50	2,392	33	1,942	4,366
USR UT Holding Tank Installation (48K)			113.16	3243.00	274.52	36589.00	40106.52
For the sanitary effluent system. Based on crews and prices taken from the MCACES database. Assume this work will be done by a utilities subcontractor.	1.00 EA	JULITY3	113	5,282	447	59,599	65,328
USR UT Pump Control system			0.00	0.00	1000.00	0.00	1000.00
Assume $1,000 per system for the sumps. Assume this work will be done by a utilities subcontractor.	2.00 EA		0	0	3,258	0	3,258
USR EL O/H Electric Installation			18.30	579.90	80.92	588.93	1349.75
Based on crews and prices taken from the MCACES database. Assume this work will be done by an electrical subcontractor.	14.89 MLF	JULITY11	272	14,065	1,963	16,709	32,736

01.04. ANCILLARY	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR EL Transformer Installation			15.98	506.42	70.66	602.00	1179.08
Based on crews and prices taken from the MCACES database. Assume this work will be done by a electrical subcontractor.	13.00 EA	JULITY11	208	10,724	1,496	12,748	24,967
USR EL Fiber Optics Installation			0.04	1.28	0.25	0.91	2.43
Based on crews and prices taken from the MCACES database. Assume this work will be done by an electrical subcontractor.	1525.00 LF	JULITY9	61	3,171	610	2,260	6,041
USR EL Light Installation			4.86	154.04	21.49	294.45	469.98
For installation of lights only, light pole installation estimated separately. Based on crews and prices taken from the MCACES database. Assume this work will be done by an electrical subcontractor.	94.00 EA	JULITY11	457	23,585	3,291	45,084	71,960
USR EL Light Pole Installation			6.27	199.96	38.45	1034.88	1273.29
Light pole installation only, light installation estimated separately. Based on crews and pric4es taken from the MCACES database. Assume this work will be done by an electrical subcontractor.	94.00 EA	JULITY9	589	30,617	5,888	158,454	194,958
USR UT Pipe Installation, 18" RCP			0.32	8.34	0.70	8.22	17.25
Pipe for hookup to the raw water export line. Based on crews and prices taken from the MCACES database. Assume this work will be done by a utilities subcontactor.	430.00 LF	JULITY5	138	3,839	488	5,757	12,084
USR UT Pipe Installation, 3" CI			0.14	4.19	0.05	3.05	7.29
Pipe for hookup to the raw water export line. Based on crews,and prices taken from the MCACES database. Assume this work will be done by a utilities subcontractor.	360.00 LF	JULITY12	51	2,458	31	1,788	4,277
USR UT Pipe Installation, 1" PVC			0.02	0.72	0.02	0.17	0.90
Pressure line for hookup to the potable water system. Based on crews and prices taken from the	1017.00 LF	JULITY13	25	1,187	26	282	1,495

01.04. ANCILLARY	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
MCACES database. Assume this work will be done by a utilities subcontractor.						
USR UT Pump Installation 3 GPM @ 120'		12.50	367.07	5.00	994.70	1366.77
For the potable water system. Based on crews and prices from the MCACES database. Assume this work will be done by a utilities subcontractor.	1.00 EA JULITY6	13	598	8	1,620	2,226
USR UT Pump Installation 14 GPM @ 205'		12.50	367.07	5.00	1292.60	1664.67
Pump for the potable water system. Based on crews and prices taken from the MCACES database. Assume this work will be done by a utilites subcontractor.	1.00 EA JULITY6	13	598	8	2,105	2,712
USR UT Holding Tank Installation (600)		6.49	186.01	15.75	1205.00	1406.76
Backwash tank for potable water system. Based on crews and prices taken from the MCACES database. Assume this work will be performed by a utilities subcontractor.	1.00 EA JULITY3	6	303	26	1,963	2,291
USR UT Holding Tank Installation (6K)		17.20	492.94	41.73	3604.00	4138.66
Clearwell holding tank for potable water system. BAsed on crews and prices taken from the MCACES database. Assume this work will be done by a utilities subcontractor.	1.00 EA JULITY3	17	803	68	5,870	6,741
01.04.06.02. EXPENSES						
USR EP Potable Water Testing		0.00	0.00	0.00	2000.00	2000.00
Based on a quote from WHC as a service.	1.00 EA	0	0	0	2,000	2,000
01.04.06.03. OPERATIONS AND MAINTENANCE						
ANCILLARY		2,631	129,786	1,722,343	462,602	2,314,732

01.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
01.05. SUPPORT						
01.05.01. SUPPORT						
01.05.01.01. CAPITAL COSTS						
USR AA Forklift capital cost		0.00	0.00	84323.00	0.00	84323.00
Based on prices taken from the MCACES database.	2.00 EA	0	0	227,101	0	227,101
USR AA Ambulance		0.00	0.00	110000.00	0.00	110000.00
Based on prices provided by WHC from quote by Hanford Fire Department.	1.00 EA	0	0	148,128	0	148,128
USR AA Meteorological Station		0.00	0.00	8080.00	0.00	8080.00
Based on quote from Response Rentals.	1.00 EA	0	0	10,881	0	10,881
USR AA Installation of Met Station		7.11	207.16	50.70	1850.00	2107.85
Assume a total weight of 1 ton for the aluminum tower. Based on crews and production rates taken from the MCACES database.	1.00 TON JH08OMB4	7	279	68	2,491	2,838
USR AA Real Time Air Monitor		0.00	0.00	2975.00	0.00	2975.00
Assume one for each excavation open which is a maximum of 4.	4.00 EA	0	0	16,025	0	16,025
USR AA Hi-vol Samplers		0.00	0.00	1470.00	0.00	1470.00
Assume four for each open excavation and its associated stockpile, which is a maximum of 4 open sites, plus four for the central stockpile. Total = 4sp+4ex+1csp=9 active sites * 4/site = 36.	36.00 EA	0	0	71,263	0	71,263
USR AA Storage Trailers		0.00	0.00	22400.00	0.00	22400.00
Equipment parts storage trailers. Cost based on 14'x40' = 560 sf @ $40/sf = $22,400 ea. Price quote from GELCO.	2.00 EA	0	0	60,328	0	60,328
USR AA 2 1/2 ton service/oil lube truck		0.00	0.00	88250.00	0.00	88250.00
Based on quote from L&M Truck Sales.	1.00 EA	0	0	118,839	0	118,839

01.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA 1 Ton Service/Oil Lube Truck		0.00	0.00	37650.00	0.00	37650.00
Based on quote from L&M Truck Sales.	1.00 EA	0	0	50,700	0	50,700
USR AA Mechanics Service Truck		0.00	0.00	68750.00	0.00	68750.00
Based on quote from L&M Truck Sales.	1.00 EA	0	0	92,580	0	92,580
USR AA Tire Truck		0.00	0.00	75950.00	0.00	75950.00
Based on quote from L&M Truck Sales.	1.00 EA	0	0	102,275	0	102,275
USR AA 2000 Gallon Fuel Truck		0.00	0.00	56000.00	0.00	56000.00
Based on quote from L&M Truck Sales.	1.00 EA	0	0	75,410	0	75,410
USR AA Trailer/Aid Station		0.00	0.00	19760.00	0.00	19760.00
8'x26' = 208 sf trailer for medics at $95/sf = $19,760. Based on quote for decon trailers from GELCO.	1.00 EA	0	0	26,609	0	26,609
USR AA Computer Costs		0.00	0.00	5000.00	0.00	5000.00
Assume $5,000 per computer.	5.00 EA	0	0	33,665	0	33,665
USR AA Steam Cleaner		0.00	0.00	3250.00	0.00	3250.00
For occasional cleaning of all equipment. Price taken from the MCACES database.	1.00 EA	0	0	4,376	0	4,376
USR AA Portable Radios		0.00	0.00	0.00	600.00	600.00
Assume 23 from the excavation crews, 34 from the tranport operation, 11 from reclamation operation, 10 from the office area, and 20 from the miscellaneous operations will need portable radios. Total = 98 use 100.	100.00 EA	0	0	0	80,797	80,797
USR AA Lighting with gen set		0.00	0.00	16117.00	0.00	16117.00
1 set of 2 lights for each active excavation. Based on price taken from the MCACES database.	8.00 EA	0	0	173,627	0	173,627

01.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
01.05.01.02. EXPENSES						
MIL AB General Superintendent (P.M.)		0.00	0.00	0.00	5300.00	5300.00
	12.00 MON N/A	0	0	0	85,645	85,645
USR EP Garbage		0.00	0.00	0.00	10000.00	10000.00
Assume garbage collection will be $10,000 per year.	1.00 EA	0	0	0	10,000	10,000
USR EP Dosimetry		0.00	0.00	0.00	375.00	375.00
$200/yr for dosimetry and $175/yr for whole body count. Total = $375/yr. 40 people need dosimetry the first year.	40.00 EA	0	0	0	15,000	15,000

01.05.01.03. OPERATIONS AND MAINTENANCE

It is estimated the pre-construction operations will need lighting from 4 pm to 1 am 4 months of the year and 7 pm to 1 am 5 months or the year.
9 hrs/day * 20.83 days/mo * 4 mo/year = 750 hrs/yr.
6 hrs/day * 20.83 days/mo * 5 mo/year = 625 hrs/yr.
Total = 1375 hrs/yr

	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR OM Septic Service		0.00	0.00	0.00	14729.00	14729.00
Cost for supplying and servicing 17 porta-potties. Based on a quote from Able Tank and Septic Service. Will be provided as a service.	1.00 YR	0	0	0	14,729	14,729
USR AC Lighting with gen set		0.00	0.00	3.98	0.00	3.98
	1675.00 HR JFLITE	0	0	3,977	0	3,977
SUPPORT		7	279	1,220,854	208,662	1,429,794

01.06. RECLAMATION

01.06.01. RECONTOUR/BACKFILL

01.06.01.01. CAPITAL COSTS

01.06.01.02. EXPENSES

01.06.01.03. OPERATIONS AND MAINTENANCE

01.06. RECLAMATION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
01.06.02. REVEGETATION						
01.06.02.01. CAPITAL COSTS						
01.06.02.02. EXPENSES						
01.06.02.03. OPERATIONS AND MAINTENANCE						
01.06.03. DEMOBILIZATION						
01.06.03.01. CAPITAL COSTS						
01.06.03.02. EXPENSES						
01.06.03.03. OPERATIONS AND MAINTENANCE						
RECLAMATION		0	0	0	0	0
FY 1996		56,842	2,165,360	8,490,463	7,400,020	18,055,843

02.01. PRE-CONSTRUCTION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
02. FY 1997							
02.01. PRE-CONSTRUCTION							
02.01.01. PROCUREMENT							
02.01.01.01. CAPITAL COSTS							
02.01.01.02. EXPENSES							
02.01.01.03. OPERATIONS AND MAINTENANCE							
02.01.02. TRAINING							
02.01.02.01. CAPITAL COSTS							
USR CC 8 hr Haz Wst Trng Refresher			0.00	0.00	0.00	130.00	130.00
	218.00 EA		0	0	0	28,340	28,340
USR CC 8 hr Rad Worker Trng Refresher			0.00	0.00	0.00	200.00	200.00
	218.00 EA		0	0	0	43,600	43,600
02.01.02.02. EXPENSES							
02.01.02.03. OPERATIONS AND MAINTENANCE							
02.01.03. SITE PREPARATION							
02.01.03.01. CAPITAL COSTS							
02.01.03.02. EXPENSES							
02.01.03.03. OPERATIONS AND MAINTENANCE							
02.01.04. SITE MOBILIZATION							
02.01.04.01. CAPITAL COSTS							
02.01.04.02. EXPENSES							
02.01.04.03. OPERATIONS AND MAINTENANCE							
PRE-CONSTRUCTION			0	0	0	71,940	71,940

02.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST

02.02. EXCAVATION/DEMOLITION
The following sites will be excavated during FY 97:
116-B-3, 116-B-2, 132-B-3, 126-B-3, 116-B-5, 116-B-4, 116-B-10, 116-B-9,
116-B-12, 116-B-6A, 116-B-6B, 1607-B3, 118-B-6, *118-B-10.
* Indicates excavation occurs in more than one fiscal year.

02.02.01. EXCAVATION/DEMOLITION

02.02.01.01. CAPITAL COSTS

USR AA 150,000 lb excavator		0.00	0.00	14214.87	0.00	14214.87
2 excavators for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	24.00 MO	0	0	459,407	0	459,407
USR AA 520 hp dozer		0.00	0.00	13326.49	0.00	13326.49
1 for excavation and 2 for stockpile management, 12 mo each. Based on a 5 yr lease purchase plan. Price quote from Wester States Caterpillar.	36.00 MO	0	0	646,043	0	646,043
USR AA 375 hp front end loader		0.00	0.00	9783.78	0.00	9783.78
1 loader for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO	0	0	158,100	0	158,100
USR AA Crusting Agent		0.00	0.00	0.00	2.50	2.50
Based on quote from Soil Cement. Application done by water tanks and trucks.	6250.00 GAL	0	0	0	21,041	21,041

02.02.01.02. EXPENSES

02.02.01.03. OPERATIONS AND MAINTENANCE

USR AC Small sites with E1 crew		0.02	0.49	0.20	0.00	0.69
E1 crew consists of:	8622.00 CY JEXC1	142	5,647	2,352	0	7,999

1 Equipment operator
1 Laborer
.5 Foreman
1 HPT
1 Hydraulic Excavator

Production rate = 324 cy/hr

02.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Medium sites with E1 crew		0.02	0.46	0.19	0.00	0.65
E1 crew consists of:	24114 CY JEXC1	374	14,920	6,213	0	21,133
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator Production rate = 343 cy/hr						
USR AC Excavation of overburden & ramp		0.02	0.53	0.31	0.00	0.83
with E-2 crew.	27126 CY JEXC2	487	19,212	11,238	0	30,450
E2 crew consists of: 2 Equipment operators 1 Laborer .5 Foremen 1 HPT 1 Bulldozer 1. Front End Loader Production rate = 381 cy/hr						
USR AC Excavation with grapples E-3		0.02	0.55	0.25	0.00	0.80
E3 crew consists of:	21128 CY JEXC3	393	15,677	7,034	0	22,712
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 286 cy/hr						
USR AC Burial grounds with E3 crew		0.03	0.83	0.37	0.00	1.20
E3 crew consist of:	132798 CY JEXC3	3,718	148,327	66,552	0	214,879
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 190 cy/hr						
USR AC Concrete Exc/Demo with E-4		0.14	4.15	3.74	0.00	7.89
E4 crew consists of:	1445.00 CY JEXC4	202	8,070	7,279	0	15,349
1 Equipment operator 1 Laborer .5 Foreman 1 HPT						

02.02. EXCAVATION/DEMOLITION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
1 Hydraulic Excavator with concrete processing equipment Production rate = 38 cy/hr							
USR AC E-1 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-1 crew will be down for 5.95 days * 8 hrs per day = 47.6 hrs, USE 48 hrs.	48.00 HR	JEXSB1	168	6,702	0	0	6,702
USR AC E-2 crew standby (weather delay)			4.50	131.83	0.00	0.00	131.83
It is estimated the E-2 crew will be down for 3.3 days * 8 hrs per day = 27 hrs.	27.00 HR	JEXSB2	122	4,793	0	0	4,793
USR AC E-3 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-3 crew will have 68 down days * 8 hrs day = 544 hrs, USE 544 hrs.	544.00 HR	JEXSB3	1,904	75,952	0	0	75,952
USR AC E-4 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-4 crew will have 3.15 down days * 8 hrs per day = 25.2 hrs, USE 26 hrs.	26.00 HR	JEXSB4	91	3,630	0	0	3,630
USR AC Metals Exc/Demo with E-4			0.28	8.29	7.48	0.00	15.78
E4 crew consists of: 1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic exavator with concrete processing equipment Production rate = 19 ton/hr	60.00 TON	JEXC4	17	670	604	0	1,275
USR AC Concrete loading with E-3 crew			0.02	0.55	0.25	0.00	0.80
E3 crew consists of: 1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 286 cy/hr	1445.00 CY	JEXC3	27	1,072	481	0	1,553

02.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Metals loading with E3 crew E3 crew consists of: 1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 171 tons/hr	60.00 TON JEXC3	0.03 2	0.92 74	0.41 33	0.00 0	1.34 108
USR AC Spoil pile dust suppression Consists of 1-8,000 gallon water tank and sprinkler. Will need to be operated 250 days/yr, 8 hrs/shift * 1 shifts = 2000 hrs.	2000.00 HR JDST1	0.00 0	0.00 0	17.35 46,728	0.00 0	17.35 46,728
USR AC Excavation dust suppression Consists of 1 water truck with driver for each active excavation. 2080 hrs/yr/shift * 1 shift = 2080 hrs.	2080.00 HR JDST3	4.00 8,320	111.36 311,915	52.16 146,110	0.00 0	163.52 458,025
USR AC Spoil Pile Management Crew consists of 2 bulldozers with equipment operators. 2 crews/shift * 2080 hrs/yr * 1 shift = 2080 hrs.	4160.00 HR JMSCL7	1.00 4,160	28.62 160,327	48.32 270,677	0.00 0	76.94 431,004
EXCAVATION/DEMOLITION		20,126	776,988	1,828,852	21,041	2,626,881
02.03. TRANSPORTATION						
02.03.01. RAIL						
02.03.01.01. CAPITAL COSTS						
USR AA Locomotives 2 locomotives for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Morrison Knudsen Locomotives Division for a refurbished locomotive.	24.00 MO	0.00 0	0.00 0	16056.19 518,916	0.00 0	16056.19 518,916

02.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
02.03.01.02. EXPENSES							
02.03.01.03. OPERATIONS AND MAINTENANCE							
USR OM Railroad track maintenance			0.00	0.00	0.00	20000.00	20000.00
Track maintenance will be provided as a service from WHC for $20,000 per mile.	19.00 MI		0	0	0	380,000	380,000
USR OM Locomotive operations			4.00	109.76	107.55	0.00	217.31
Crew consists of 3 locomotive operators and 1 broker. Locomotive needs to be operating every day of operations = 2080 hrs.	2080.00 HR	JTRNS3	8,320	228,301	223,704	0	452,005
USR OM Rail Maintenance Facility M&O			0.00	0.00	960000.00	0.00	960000.00
Price based on direction from WHC.	1.00 YR		0	0	960,000	0	960,000
02.03.02. ROAD							
02.03.02.01. CAPITAL COSTS							
USR AA 275 hp motor grader			0.00	0.00	7969.35	0.00	7969.35
1 grader for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	128,780	0	128,780
USR AA Trailers			0.00	0.00	395.89	0.00	395.89
20 trailers for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Red River Trailers.	240.00 MO		0	0	321,859	0	321,859
USR AA Trucks			0.00	0.00	4102.72	0.00	4102.72
20 trucks for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Kenworth.	240.00 MO		0	0	1,325,948	0	1,325,948
USR AA Roadbase Stockpile			0.00-	0.00	0.00	12.50	12.50
Gravel losses due to regrading during the course of the year. Material prices based on $12.50/cy.	4318.00 CY		0	0	0	72,684	72,684
USR AA 84" Wide Vibratory Roller			0.00	0.00	2577.00	0.00	2577.00
1 roller for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States	12.00 MO		0	0	41,643	0	41,643

02.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
Caterpillar.							
02.03.02.02. EXPENSES							
02.03.02.03. OPERATIONS AND MAINTENANCE							
USR TR Truck operations			0.04	1.16	1.58	0.00	2.73
Truck crew consists of tractor trailer combinations with driver. Production rate = 37.1 cy/hr	213788 CY	JTRNS1	8,759	402,477	548,630	0	951,107
USR AC Road crew operations			2.00	56.76	34.44	0.00	91.20
Crew consists of Motor grader and Water truck with operators. Operates 2080 hrs/yr/shift.	2080.00 HR	JMSCL12	4,160	158,982	96,462	0	255,444
02.03.03. CONTAINERS							
02.03.03.01. CAPITAL COSTS							
USR AA Container handlers			0.00	0.00	8698.79	0.00	8698.79
2 handlers for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Washington Liftruk.	24.00 MO		0	0	281,134	0	281,134
02.03.03.02. EXPENSES							
02.03.03.03. OPERATIONS AND MAINTENANCE It is estimated 105 containers will be operating at any one time.							
USR AC Container Maintenance			0.00	0.00	378.00	0.00	378.00
Container used only during excavation hours = 200 days/yr, 5.25 hrs/shift	1050.00 HR	JTRNS4	0	0	534,471	0	534,471
USR AC Container Transfer			2.00	56.42	28.99	0.00	85.41
Container loading occurs throughout the year = 2080 hrs/yr/shift	2080.00 HR	JTRNS5	4,160	158,030	81,192	0	239,222
TRANSPORTATION			25,399	947,791	5,062,739	452,684	6,463,213

02.04. ANCILLARY	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
02.04. ANCILLARY							
02.04.01. EQUIPMENT DECON FACILITY							
02.04.01.01. CAPITAL COSTS							
02.04.01.02. EXPENSES							
02.04.01.03. OPERATIONS AND MAINTENANCE							
USR AC Equipment Decon Operations			1.00	25.38	0.00	0.00	25.38
Crew consists of 1 operator. Operations based on 2080 hrs/yr/shift	2080.00 HR	JMSCL11	2,080	71,088	0	0	71,088
USR OM Equipment Decon Maintenance			0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance and all utilities. Provided as a service by WHC.	1440.00 SF		0	0	0	51,480	51,480
02.04.02. SURVEY STATION							
02.04.02.01. CAPITAL COSTS							
02.04.02.02. EXPENSES							
02.04.02.03. OPERATIONS AND MAINTENANCE It is estimated two stations will each be manned by 4 HPT's with equipment. The stations will be operated 250 days per year 8 hours per shift = 2000 hrs per shift per year plus holidays = 2080 hrs. 2080 hrs * 2 crews/shift * 1 shift = 4160 hrs.							
USR AC Survey station			4.00	144.48	0.00	0.00	144.48
	4160.00 HR	JFRSK1	16,640	609,365	0	0	609,365
02.04.03. OFFICE AREA							
02.04.03.01. CAPITAL COSTS							
02.04.03.02. EXPENSES							
USR AB Office Supplies and Equipment			0.00	0.00	0.00	25000.00	25000.00
Assume an annual cost of $25,000.	1.00 EA		0	0	0	33,665	33,665

02.04. ANCILLARY	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
02.04.03.03. OPERATIONS AND MAINTENANCE						
USR OM Waste Removal 13,261 gallons/day * 250 days/yr = 3,315,250. Provided as a service from WHC at a rate of $135/2000 gal = $0.0675/gal. For removal of liquid wastes from sanitary holding tanks.	3315250 GAL	0.00 0	0.00 0	0.07 232,068	0.00 0	0.07 232,068
USR OM Office Maintenance $35.75/sf/yr. Includes facility maintenance, utilities, and janitorial. Based on 24'x48'= 1152 sf command control station, 28'x60'= 1680 sf lunchroom, and 42'x70'=2940 sf general support area. Total = 5772 sf. Provided as a service from WHC.	5772.00 SF	0.00 0	0.00 0	0.00 0	35.75 206,349	35.75 206,349
USR OM Change Trailer Maintenance $35.75/sf/yr. Includes facility maintenance, all utilities, and janitorial. Based on 14'x60' = 840 sf female trailer and a 28'x60' = 1680 sf male trailer. Total = 2520 sf. Provided as a service from WHC.	2520.00 SF	0.00 0	0.00 0	0.00 0	35.75 90,090	35.75 90,090
USR OM Telephone $103.95/line/mo * 12 mo = $1247.4/line/yr. Assume one line to both offices and one to the lunchroom. Total = 3 lines. Provided as a service from WHC.	3.00 EA	0.00 0	0.00 0	0.00 0	1247.40 3,742	1247.40 3,742
02.04.04. PERSONNEL DECON/CHANGE AREA						
02.04.04.01. CAPITAL COSTS						
02.04.04.02. EXPENSES						
02.04.04.03. OPERATIONS AND MAINTENANCE						
USR OM Maintenance $35.75/sf/yr. Includes facility maintenance and all utilities. Based on	1568.00 SF	0.00 0	0.00 0	0.00 0	35.75 56,056	35.75 56,056

02.04. ANCILLARY	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
2-14'x56'= 1568 sf decontamination trailers. Provided as a service from WHC.						
02.04.05. RECEIVING AREA/WAREHOUSE						
02.04.05.01. CAPITAL COSTS						
02.04.05.02. EXPENSES						
02.04.05.03. OPERATIONS AND MAINTENANCE						
02.04.06. UTILITIES						
02.04.06.01. CAPITAL COSTS						
02.04.06.02. EXPENSES						
USR EP Potable Water Testing		0.00	0.00	0.00	2000.00	2000.00
Based on a quote from WHC as a service.	1.00 EA	0	0	0	2,000	2,000
02.04.06.03. OPERATIONS AND MAINTENANCE						
ANCILLARY		18,720	880,454	232,068	443,383	1,555,904
02.05. SUPPORT						
02.05.01. SUPPORT						
02.05.01.01. CAPITAL COSTS						
02.05.01.02. EXPENSES						
MIL AB Area Supervisors		0.00	0.00	0.00	5000.00	5000.00
5 supervisors/shift * 1 shift * 12 mo = 60 mo.	60.00 MON N/A	0	0	0	403,984	403,984
MIL AB Clerks		0.00	0.00	0.00	1700.00	1700.00
1 clerk/shift * 1 shift * 12 mo = 12 mo.	12.00 MO N/A	0	0	0	27,471	27,471
MIL AB Network Administrator		0.00	0.00	0.00	4200.00	4200.00
1 administrator/shift * 1 shift * 12 mo = 12 mo.	12.00 MON N/A	0	0	0	67,869	67,869
MIL AB Project Engineer		0.00	0.00	0.00	4700.00	4700.00
5 engineers/shift * 1 shift * 12 mo = 60 mo.	60.00 MON N/A	0	0	0	379,745	379,745

02.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
MIL AB Site Safety and QA		0.00	0.00	0.00	3800.00	3800.00
1 engineer/shift * 1 shift * 12 mo = 12 mo.	12.00 MON N/A	0	0	0	61,406	61,406
USR EP Medic support		4160.00	100000.00	0.00	0.00	100000.00
2 medics onsite @ $50,000/yr.	1.00 YR	4,160	100,000	0	0	100,000
USR EP Laundry Service		0.00	0.00	0.00	728196.00	728196.00
Based on 105 people changing 4 times a day for whites and 1 time a day for blues. Each change for whites weigns 3.02# and each change for blues 2#.	1.00 EA	0	0	0	728,196	728,196
USR EP Mask Service		0.00	0.00	0.00	240.48	240.48
$20.04/mo * 12 mo = $240.48/yr Assume the excavation crew will be in masks 25% of the time. Need 4 mask changes per day. 22 people @ 25% * 4/shift = 22 masks/shift.	22.00 EA	0	0	0	5,291	5,291
USR EP Radio Maintenance		0.00	0.00	0.00	64.50	64.50
Assume 1 radio technician supporting the remediation charging out at $64.50/hr with 2080 hrs/yr.	2080.00 HR	0	0	0	134,160	134,160
USR EP Dosimetry		0.00	0.00	0.00	375.00	375.00
$200/yr for dosimetry and $175/yr for whole body count. Total = $375/yr. 117 people need dosimetry the first year.	117.00 EA	0	0	0	43,875	43,875
MIL AB General Superintendent (P.M.)		0.00	0.00	0.00	5300.00	5300.00
	12.00 MON N/A	0	0	0	85,645	85,645
USR EP Field Instrument Maintenance		0.00	0.00	0.00	64.50	64.50
Assume one technician to support the project charging out at a rate of $64.5/hr. 2080 hrs/yr.	2080.00 HR	0	0	0	134,160	134,160
USR EP Garbage		0.00	0.00	0.00	10000.00	10000.00
Assume garbage collection will be $10,000 per year.	1.00 EA	0	0	0	10,000	10,000
USR EP Transport Vehicle Maintenance		0.00	0.00	0.00	2000.00	2000.00
Assume $2,000 per vehicle per year for maintenance at the 200	30.00 EA	0	0	0	60,000	60,000

02.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
Area vehicle maintenance shop.						
02.05.01.03. OPERATIONS AND MAINTENANCE It is estimated the excavation sites will need 2 sets of lights per excavation and only 1 site will be operated at one time throughout the fiscal year = 2 sets of lights. It is estimated the lights will be operated from 4 pm to 1 am 4 months of the year and 7 pm to 1 am 8 months per year. 9 hrs/day * 20.83 days/mo * 4 mo/yr = 750 hrs/yr. 6 hrs/day * 20.83 days/mo * 8 mo/yr = 1000 hrs/yr. Total = 1750 hrs/yr. 2 sets * 1750 hrs/yr = 3500 hrs.						
USR AC Lighting with gen set		0.00	0.00	3.98	0.00	3.98
	3500.00 HR JFLITE	0	0	18,758	0	18,758
USR AC Lid replacement/removal		1.00	27.30	7.83	0.00	35.13
Crew consists of 1 forklift with operator. Operations based on 2080 hrs/yr.	2080.00 EA JMSCL10	2,080	76,466	21,925	0	98,391
USR AC Classification operating crew		2.00	50.16	0.00	0.00	50.16
Crew consists of 2 operators. Operations based on 2080 hrs/yr/shift	2080.00 HR JMSCL9	4,160	140,496	0	0	140,496
USR AC Offshift operations		8.00	230.97	39.81	0.00	320.78
2080 hrs/yr Crew consists of : 1 HPT 1 Foreman Road crew 1 Grader with operator 1 Compactor with operator 1 Water truck with operator 1 Flatbed truck with driver Decon waste removal 1 Vacuum truck with operator Water refill 1 Water truck with operator	2080.00 HR JMSCL13	16,640	546,938	251,563	0	898,500
USR AC Miscellaneous Laborers		3.00	75.24	9.50	0.00	84.74
Crew consists of 3 laborers with pickups. Operation based on 2080 hrs/yr/shift	2080.00 HR JMSCL8	6,240	210,744	26,596	0	237,340
USR OM Septic Service		0.00	0.00	0.00	14729.00	14729.00
Cost for supplying and servicing 17 porta-potties. Service provided by WHC.	1.00 YR	0	0	0	14,729	14,729

02.05. SUPPORT	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Sample Transport			1.00	24.99	3.18	0.00	28.17
Crew consists of one truck driver with pickup. Will pick up samples from the excavations and transport them to the lab for analysis. 2080 hrs/yr/shift.	2080.00 HR	JMSCL6	2,080	69,996	8,910	0	78,906
SUPPORT			35,360	1,244,640	327,753	2,156,531	3,728,924
02.06. RECLAMATION							
02.06.01. RECONTOUR/BACKFILL							
02.06.01.01. CAPITAL COSTS							
02.06.01.02. EXPENSES							
02.06.01.03. OPERATIONS AND MAINTENANCE							
02.06.02. REVEGETATION							
02.06.02.01. CAPITAL COSTS							
02.06.02.02. EXPENSES							
02.06.02.03. OPERATIONS AND MAINTENANCE							
02.06.03. DECONTAMINATION/DISPOSAL							
02.06.03.01. CAPITAL COSTS							
02.06.03.02. EXPENSES							
02.06.03.03. OPERATIONS AND MAINTENANCE							
RECLAMATION			0	0	0	0	0
FY 1997			99,605	3,849,872	7,451,411	3,145,578	14,446,861

03.01. PRE-CONSTRUCTION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
03. FY 1998						
03.01. PRE-CONSTRUCTION						
03.01.01. PROCUREMENT						
03.01.01.01. CAPITAL COSTS						
03.01.01.02. EXPENSES						
03.01.01.03. OPERATIONS AND MAINTENANCE						
03.01.02. TRAINING						
03.01.02.01. CAPITAL COSTS						
USR CC 8 hr Rad Worker Trng Refresher		0.00	0.00	0.00	200.00	200.00
	218.00 EA	0	0	0	43,600	43,600
USR CC 8 hr Haz Wst Trng Refresher		0.00	0.00	0.00	130.00	130.00
	218.00 EA	0	0	0	28,340	28,340
03.01.02.02. EXPENSES						
03.01.02.03. OPERATIONS AND MAINTENANCE						
03.01.03. SITE PREPARATION						
03.01.03.01. CAPITAL COSTS						
03.01.03.02. EXPENSES						
03.01.03.03. OPERATIONS AND MAINTENANCE						
03.01.04. SITE MOBILIZATION						
03.01.04.01. CAPITAL COSTS						
03.01.04.02. EXPENSES						
03.01.04.03. OPERATIONS AND MAINTENANCE						
PRE-CONSTRUCTION		0	0	0	71,940	71,940

03.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST

03.02. EXCAVATION/DEMOLITION
The following sites will be excavated during FY 98:
*118-B-10, 118-B-5, 118-B-7, 118-B-4, *126-B-1, 118-B-7, 116-B-16, 118-C-2, 116-C-2A, 116-C-2B, 116-C-2C, 132-C-1, 118-C-4, *116-B11, *118-C-1, 128-C-1, 116-B-7, 1607-B7.
* Indicates the excavation will occur in more than one fiscal year.

03.02.01. EXCAVATION/DEMOLITION

03.02.01.01. CAPITAL COSTS

Item	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA 150,000 lb excavator (5 yr)		0.00	0.00	14214.87	0.00	14214.87
2 excavators for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	24.00 MO	0	0	459,407	0	459,407
USR AA 520 hp dozer		0.00	0.00	13326.49	0.00	13326.49
1 for excavation and 2 for spoilpile management at 12 mo each. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	36.00 MO	0	0	646,043	0	646,043
USR AA 375 hp front end loader		0.00	0.00	9783.78	0.00	9783.78
1 loader for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO	0	0	158,100	0	158,100
USR AA 150,000 lb excavator (4 yr)		0.00	0.00	17105.80	0.00	17105.80
4 excavators for 12 months each. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	48.00 MO	0	0	1,105,676	0	1,105,676
USR AA Grapples		0.00	0.00	34800.00	0.00	34800.00
$34,800 for grapples based on quote from LaBounty.	2.00 EA	0	0	93,724	0	93,724
USR AA Universal Processor		0.00	0.00	235920.00	0.00	235920.00
$88,920 for processor, $39,600 for pulverizer, $39,600 for the cracker, $62,040 for the shear jaws, and $5,760 for rotation kit = $235,920. Based on quote from LaBounty.	1.00 EA	0	0	317,693	0	317,693

03.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA Crusting Agent		0.00	0.00	0.00	2.50	2.50
Based on quote from Soil Sement. Application done using water tanks and trucks.	6250.00 GAL	0	0	0	21,041	21,041
USR AA Hydraulic Hammer		0.00	0.00	123720.00	0.00	123720.00
$113,340 for hammer and $10,380 for attaching kit = $123,720. Based on quote from LaBounty.	1.00 EA	0	0	166,603	0	166,603
03.02.01.02. EXPENSES						
03.02.01.03. OPERATIONS AND MAINTENANCE						
USR AC Excavation of overburden & ramp		0.02	0.53	0.31	0.00	0.83
with E-2 crew. E2 crew consists of: 2 Equipment operators; 1 Laborer; .5 Foremen; 1 HPT; 1 Bulldozer; 1 Front End Loader. Production rate = 381 cy/hr	99339 CY JEXC2	1,783	70,355	41,157	0	111,512
USR AC Excavation with grapples E-3		0.02	0.55	0.25	0.00	0.80
E3 crew consists of: 1 Equipment operator; 1 Laborer; .5 Foreman; 1 HPT; 1 Hydraulic excavator with grapples. Production rate = 286 cy/hr	76833 CY JEXC3	1,429	57,012	25,580	0	82,592
USR AC Metals loading with E3 crew		0.03	0.92	0.41	0.00	1.34
E3 crew consists of: 1 Equipment operator; 1 Laborer; .5 Foreman; 1 HPT; 1 Hydraulic excavator with grapples. Production rate = 171 tons/hr	29262 TON JEXC3	910	36,315	16,294	0	52,609

03.02. EXCAVATION/DEMOLITION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Burial grounds with E3 crew			0.03	0.83	0.37	0.00	1.20
E3 crew consist of:	281537 CY	JEXC3	7,883	314,459	141,093	0	455,552
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 190 cy/hr							
USR AC Concrete Exc/Demo with E-4			0.14	4.15	3.74	0.00	7.89
E4 crew consists of:	11344 CY	JEXC4	1,588	63,353	57,144	0	120,497
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic Excavator with concrete processing equipment Production rate = 38 cy/hr							
USR AC E-1 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-1 crew will be down for 50 days * 8 hrs per day = 400 hrs.	400.00 HR	JEXSB1	1,400	55,847	0	0	55,847
USR AC E-2 crew standby (weather delay)			4.50	131.83	0.00	0.00	131.83
It is estimated the E-2 crew will be down for 50.5 days * 8 hrs per day = 404.	404.00 HR	JEXSB2	1,818	71,720	0	0	71,720
USR AC E-3 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-3 crew will have 163 down days * 8 hrs per day = 1304 hrs.	1304.00 HR	JEXSB3	4,564	182,061	0	0	182,061
USR AC E-4 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-4 crew will have 127.5 down days * 8 hrs per day = 1020 hrs.	1020.00 HR	JEXSB4	3,570	142,409	0	0	142,409
USR AC Concrete loading with E-3 crew			0.02	0.55	0.25	0.00	0.80
E3 crew consists of:	11344 CY	JEXC3	211	8,417	3,777	0	12,194
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples							

03.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
Production rate = 286 cy/hr						
USR AC Metals Exc/Demo with E-4		0.28	8.29	7.48	0.00	15.78
E4 crew consists of:	44252 TON JEXC4	12,391	494,267	445,830	0	940,097
1 Equipment operator						
1 Laborer						
.5 Foreman						
1 HPT						
1 Hydraulic exavator with concrete processing equipment						
Production rate = 19 ton/hr						
USR AC Large sites with E1 crew		0.01	0.41	0.17	0.00	0.59
E1 crew consists of:	106213 CY JEXC1	1,483	59,161	24,638	0	83,799
1 Equipment operator						
1 Laborer						
.5 Foreman						
1 HPT						
1 Hydraulic Excavator						
Production Rate = 381 cy/hr						
USR AC Large sites with E-2 crew		0.02	0.53	0.31	0.00	0.83
E2 crew consists of:	159319 CY JEXC2	2,860	112,835	66,007	0	178,842
2 Equipment operators						
1 Laborer						
.5 Foreman						
1 HPT						
1 Bulldozer						
1 Front end loader						
Production rate = 381 cy/hr						
USR AC Spoil pile dust suppression		0.00	0.00	17.35	0.00	17.35
Consists of 1-8,000 gallon water tank and sprinkler. Will need to be operated 250 days/yr, 8 hrs/shift * 2 shifts = 4000 hrs.	4000.00 HR JDST1	0	0	93,455	0	93,455
USR AC Excavation dust suppression		4.00	111.36	52.16	0.00	163.52
Consists of 1 water truck with driver for each active excavation. 2080 hrs/yr/shift * 2 shift = 4160 hrs.	4160.00 HR JDST3	16,640	623,830	292,220	0	916,049

03.02. EXCAVATION/DEMOLITION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Spoil Pile Management			1.00	28.62	48.32	0.00	76.94
Crew consists of 2 bulldozers with equipment operators. 2 crews/shift * 2080 hrs/yr * 2 shifts = 8320 hrs.	8320.00 HR	JMSCL7	8,320	320,654	541,354	0	862,008
EXCAVATION/DEMOLITION			66,851	2,612,694	4,695,796	21,041	7,329,531
03.03. TRANSPORTATION							
03.03.01. RAIL							
03.03.01.01. CAPITAL COSTS							
USR AA Locomotives			0.00	0.00	16056.19	0.00	16056.19
2 locomotives for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Morrison Knudsen Locomotives division for a refurbished locomotive.	24.00 MO		0	0	518,916	0	518,916
03.03.01.02. EXPENSES							
03.03.01.03. OPERATIONS AND MAINTENANCE							
USR OM Railroad track maintenance			0.00	0.00	0.00	20000.00	20000.00
Track maintenance will be provided as a service from WHC for $20,000 per mile.	19.00 MI		0	0	0	380,000	380,000
USR OM Locomotive operations			4.00	109.76	107.55	0.00	217.31
Crew consists of 3 locomotive operators and 1 broker. Locomotive needs to be operating every day of operations = 2080 hrs * 2 shifts = 4160 hrs.	4160.00 HR	JTRNS3	16,640	456,602	447,408	0	904,010
USR OM Rail Maintenance Facility M&O			0.00	0.00	960000.00	0.00	960000.00
Price based on direction from WHC.	1.00 YR		0	0	960,000	0	960,000

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
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03.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
03.03.02. ROAD							
03.03.02.01. CAPITAL COSTS							
USR AA 275 hp motor grader			0.00	0.00	7969.35	0.00	7969.35
1 grader for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	128,780	0	128,780
USR AA Trucks			0.00	0.00	4102.72	0.00	4102.72
20 trucks for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Kenworth.	240.00 MO		0	0	1,325,948	0	1,325,948
USR AA Trailers			0.00	0.00	995.89	0.00	995.89
20 trailers for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Red River Trailers.	240.00 MO		0	0	321,859	0	321,859
USR AA Roadbase Stockpile			0.00	0.00	0.00	12.50	12.50
Gravel losses due to regrading during the course of the year. Material prices based on $12.50/cy.	4318.00 CY		0	0	0	72,684	72,684
USR AA 84" Wide Vibratory Roller			0.00	0.00	2577.00	0.00	2577.00
1 roller for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	41,643	0	41,643
03.03.02.02. EXPENSES							
03.03.02.03. OPERATIONS AND MAINTENANCE							
USR TR Truck operations			0.04	1.16	1.58	0.00	2.73
Truck crew consists of tractor trailer combination with driver. Production rate = 37.1 cy/hr	723241 CY	JTRNS1	29,631	1,361,573	1,856,004	0	3,217,577
USR AC Road crew operations			2.00	56.76	34.44	0.00	91.20
Crew consists of Motor grader and Water truck with operators. Operates 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JMSCL12	8,320	317,965	192,923	0	510,888

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

03.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
03.03.03. CONTAINERS							
03.03.03.01. CAPITAL COSTS							
USR AA Container handlers			0.00	0.00	8698.79	0.00	8698.79
2 handlers for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Washington Liftruck.	24.00 MO		0	0	281,134	0	281,134
03.03.03.02. EXPENSES							
03.03.03.03. OPERATIONS AND MAINTENANCE It is estimated 105 containers will be operating at any one time.							
USR AC Container Maintenance			0.00	0.00	378.00	0.00	378.00
Container used only during excavation hours = 200 days/yr, 5.25 hrs/shift * 2 shifts = 2100 hrs.	2100.00 HR	JTRNS4	0	0	1,068,943	0	1,068,943
USR AC Container Transfer			2.00	56.42	28.99	0.00	85.41
Container loading occurs throughout the year = 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JTRNS5	8,320	316,060	162,384	0	478,444
TRANSPORTATION			62,911	2,452,200	7,305,942	452,684	10,210,826
03.04. ANCILLARY							
03.04.01. EQUIPMENT DECON FACILITY							
03.04.01.01. CAPITAL COSTS							
03.04.01.02. EXPENSES							
03.04.01.03. OPERATIONS AND MAINTENANCE							
USR AC Equipment Decon Operations			1.00	25.38	0.00	0.00	25.38
Crew consists of 1 operator. Operations based on 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JMSCL11	4,160	142,177	0	0	142,177
USR OM Equipment Decon Maintenance			0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance and all utilities. Provided as a service from WHC.	1440.00 SF		0	0	0	51,480	51,480

03.04. ANCILLARY	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
03.04.02. SURVEY STATION							
03.04.02.01. CAPITAL COSTS							
03.04.02.02. EXPENSES							
03.04.02.03. OPERATIONS AND MAINTENANCE It is estimated two stations will each be manned by 4 HPT's with equipment. The stations will be operated 250 days per year 8 hrs per shift = 2000 hrs per year per shift plus holidays = 2080. 2080 hrs * 2 crews/shift * 2 shifts/day = 8320 hrs.							
USR AC Survey station			4.00	144.48	0.00	0.00	144.48
	8320.00 HR	JFRSK1	33,280	1,618,730	0	0	1,618,730
03.04.03. OFFICE AREA							
03.04.03.01. CAPITAL COSTS							
03.04.03.02. EXPENSES							
USR AB Office Supplies and Equipment			0.00	0.00	0.00	25000.00	25000.00
Assume and annual cost of $25,000.	1.00 EA		0	0	0	33,665	33,665
03.04.03.03. OPERATIONS AND MAINTENANCE							
USR OM Waste Removal			0.00	0.00	0.07	0.00	0.07
13,261 gallons/day * 250 days/yr = 3,315,250. Provided as a service from WHC at a rate of $135/2000 gal = $0.0675/gal. For removal of liquid wastes from sanitary holding tanks.	3315250 GAL		0	0	232,068	0	232,068
USR OM Office Maintenance			0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr Includes facility maintenance, utilities, and janitorial. Based on 24'x48'= 1152 sf command control station, 28'x60'= 1680 sf lunchroom, and 42'x70'=2940 sf general support area. Total = 5772 sf. Provided as a service from WHC.	5772.00 SF		0	0	0	206,349	206,349
USR OM Change Trailer Maintenance			0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance, all utilities, and janitorial. Based on 14'x60' = 840 sf	2520.00 SF		0	0	0	90,090	90,090

03.04. ANCILLARY	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
female trailer and a 28'x60' = 1680 sf male trailer. Total = 2520 sf.						
USR OM Telephone		0.00	0.00	0.00	1247.40	1247.40
$103.95/line/mo * 12 mo = $1247.4/line/yr. Assume one line to both offices and one to the lunchroom. Total = 3 lines	3.00 EA	0	0	0	3,742	3,742
03.04.04. PERSONNEL DECON/CHANGE AREA						
03.04.04.01. CAPITAL COSTS						
03.04.04.02. EXPENSES						
03.04.04.03. OPERATIONS AND MAINTENANCE						
USR OM Maintenance		0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance and all utilities. Based on 2-14'x56'= 1568 sf decontamination trailers.	1568.00 SF	0	0	0	56,056	56,056
03.04.05. RECEIVING AREA/WAREHOUSE						
03.04.05.01. CAPITAL COSTS						
03.04.05.02. EXPENSES						
03.04.05.03. OPERATIONS AND MAINTENANCE						
03.04.06. UTILITIES						
03.04.06.01. CAPITAL COSTS						
03.04.06.02. EXPENSES						
USR EP Potable Water Testing		0.00	0.00	0.00	2000.00	2000.00
Based on a quote from WHC as a service.	1.00 EA	0	0	0	2,000	2,000
03.04.06.03. OPERATIONS AND MAINTENANCE						
ANCILLARY		37,440	1,760,907	232,068	443,383	2,436,357

03.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
03.05. SUPPORT						
03.05.01. SUPPORT						
03.05.01.01. CAPITAL COSTS						
03.05.01.02. EXPENSES						
MIL AB Area Supervisors		0.00	0.00	0.00	5000.00	5000.00
5 area supervisor per shift. 5/shift * 12 mo * 2 shifts = 120 mo.	120.00 MON N/A	0	0	0	807,969	807,969
MIL AB Clerks		0.00	0.00	0.00	1700.00	1700.00
1 clerk /shift * 2 shifts * 12 mo = 24 mo.	24.00 MO N/A	0	0	0	54,942	54,942
MIL AB Network Administrator		0.00	0.00	0.00	4200.00	4200.00
1 administrator/shift * 2 shifts * 12 mo = 24 mo.	24.00 MON N/A	0	0	0	135,739	135,739
MIL AB Project Engineer		0.00	0.00	0.00	4700.00	4700.00
5 engineers/shift * 2 shifts * 12 mo = 120 mo.	120.00 MON N/A	0	0	0	759,491	759,491
MIL AB Site Safety and QA		0.00	0.00	0.00	3800.00	3800.00
1 engineer/shift * 2 shift * 12 mo = 24 mo.	24.00 MON N/A	0	0	0	122,811	122,811
USR EP Medic support		4160.00	100000.00	0.00	0.00	100000.00
2 medics onsite.	2.00 YR	8,320	200,000	0	0	200,000
USR EP Laundry Service (yrs 2-5)		0.00	0.00	0.00	1350000.00	1350000.00
Based on 192 people changing 4 times a day for whites and 1 time a day for blues. Each change for whites weighs 3.02# and each change for blues 2#.	1.00 EA	0	0	0	1,350,000	1,350,000
USR EP Dosimetry		0.00	0.00	0.00	375.00	375.00
$200/yr for dosimetry and $175/yr for whole body count. Total = $375/yr. 218 people need dosimetry the second through the fifth year.	218.00 EA	0	0	0	81,750	81,750
USR EP Radio Maintenance		0.00	0.00	0.00	64.50	64.50
Assume 1 radio technician supporting the remediation charging out at $64.50/hr with	2080.00 HR	0	0	0	134,160	134,160

03.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
2080 hrs/yr.						
USR EP Mask Service		0.00	0.00	0.00	240.48	240.48
\$20.04/mo * 12 mo = \$240.48/yr Assume the excavation crew will be in masks 25% of the time. Need 4 mask changes per day. 22 people @ 25% * 4/shift = 22 masks/shift * 2 shifts = 44.	44.00 EA	0	0	0	10,581	10,581
MIL AB General Superintendent (P.M.)		0.00	0.00	0.00	5300.00	5300.00
	12.00 MON N/A	0	0	0	85,645	85,645
USR EP Transport Vehicle Maintenance		0.00	0.00	0.00	2000.00	2000.00
Assume \$2,000 per vehicle per year for maintenance at the 200 Area vehicle maintenance shop.	30.00 EA	0	0	0	60,000	60,000
USR EP Garbage		0.00	0.00	0.00	10000.00	10000.00
Assume garbage collection will be \$10,000 per year.	1.00 EA	0	0	0	10,000	10,000
USR EP Field Instrument Maintenance		0.00	0.00	0.00	64.50	64.50
Assume one technician supporting the project charging out @ \$64.50/hr. Provided as a service by WHC. 2080 hrs.	2080.00 HR	0	0	0	134,160	134,160

03.05.01.03. OPERATIONS AND MAINTENANCE

It is estimate the excavation sites will need 2 sets of lights per excavation and on the average 3 sites will be operated at one time throughout the fiscal year = 6 sets of lights.

It is estimated the lights will be operated from 4 pm to 7 am 4 months of the the year and 7 pm to 7 am 8 months per year.
15 hrs/day * 20.83 days/mo * 4 mo/yr = 1250 hrs/yr.
12 hrs/day * 20.83 days/mo * 8 mo/yr = 2000 hrs/yr.
Total = 3250 hrs/yr.
6 sets * 3250 hrs/yr = 19500.

03.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Lighting with gen set		0.00	0.00	3.98	0.00	3.98
	19500 HR JFLITE	0	0	104,511	0	104,511
USR AC Lid replacement/removal		1.00	27.30	7.83	0.00	35.13
Crew consists of 1 forklift with operator. Operations based on 2080 hrs/yr * 2 shifts = 4160 hrs.	4160.00 EA JMSCL10	4,160	152,932	43,850	0	196,782

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03.05. SUPPORT	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Classification operating crew			2.00	50.16	0.00	0.00	50.16
Crew consists of 2 operators. Operations based on 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JMSCL9	8,320	280,992	0	0	280,992
USR AC Offshift operations			8.00	230.97	89.81	0.00	320.78
Crew consists of : 1 HPT 1 Foreman Road crew 1 Scraper with operator 1 Compactor with operator 1 Water truck with operator 1 Flatbed truck with driver Decon waste removal 1 Vacuum truck with operator Water refill 1 Water truck with operator Operations based on 2080 hrs/yr/shift * 1 shift = 2080 hrs.	2080.00 HR	JMSCL13	16,640	646,938	251,563	0	898,500
USR AC Miscellaneous Laborers			3.00	75.24	9.50	0.00	84.74
Crew consists of 3 laborers with pickups. Operation based on 2080 hrs/yr/shift	4160.00 HR	JMSCL8	12,480	421,488	53,192	0	474,681
USR OM Septic Service			0.00	0.00	0.00	14729.00	14729.00
Cost for supplying and servicing 17 porta-potties. Service provided by WHC.	1.00 YR		0	0	0	14,729	14,729
USR AC Sample Transport			1.00	24.99	3.18	0.00	28.17
Crew consists of one truck driver with pickup. Will pick up samples from the excavations and transport them to the lab for analysis. 2080 hrs/yr/shift * 2 shift/day = 4160 hrs.	4160.00 HR	JMSCL6	4,160	139,992	17,821	0	157,813
SUPPORT			54,080	1,842,342	470,936	3,761,977	6,075,256

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

03.06. RECLAMATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
03.06. RECLAMATION							
03.06.01. RECONTOUR/BACKFILL							
03.06.01.01. CAPITAL COSTS							
USR AA Dozer, 4 yr.			0.00	0.00	16034.92	0.00	16034.92
1 dozer based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	259,114	0	259,114
USR AA Loader, 4 yr.			0.00	0.00	11771.71	0.00	11771.71
1 loader based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	190,224	0	190,224
USR AA Compacter, 4 yr			0.00	0.00	9514.06	0.00	9514.06
2 compacters based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	24.00 MO		0	0	307,483	0	307,483
USR AA 5,000 gal water truck			0.00	0.00	166844.00	0.00	166844.00
	2.00 EA		0	0	449,349	0	449,349
03.06.01.02. EXPENSES							
03.06.01.03. OPERATIONS AND MAINTENANCE							
USR AC Backfill (loader w/ 3 trucks)			0.00	0.11	0.12	0.00	0.23
	38076 CY	JRCNTR5	144	5,482	6,147	0	11,629
USR AC Backfill (dozer), 1171 cy/hr			0.00	0.11	0.12	0.00	0.23
	260.00 CY	JRCNTR3	1	39	43	0	81
USR AC Backfill (dozer), 918 cy/hr			0.00	0.14	0.16	0.00	0.30
	4369.00 CY	JRCNTR3	22	827	915	0	1,742
USR AC Backfill (dozer), 1583 cy/hr			0.00	0.08	0.09	0.00	0.17
	11.00 CY	JRCNTR3	0	1	1	0	3
03.06.02. REVEGETATION							
03.06.02.01. CAPITAL COSTS							

03.06. RECLAMATION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
03.06.02.02. EXPENSES						
03.06.02.03. OPERATIONS AND MAINTENANCE						
03.06.03. DEMOBILIZATION						
03.06.03.01. CAPITAL COSTS						
03.06.03.02. EXPENSES						
03.06.03.03. OPERATIONS AND MAINTENANCE						
RECLAMATION		167	6,349	1,213,275	0	1,219,625
FY 1998		221,449	8,674,493	13,918,018	4,751,024	27,343,534

04.01. PRE-CONSTRUCTION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
04. FY 1999						
04.01. PRE-CONSTRUCTION						
04.01.01. PROCUREMENT						
04.01.01.01. CAPITAL COSTS						
04.01.01.02. EXPENSES						
04.01.01.03. OPERATIONS AND MAINTENANCE						
04.01.02. TRAINING						
04.01.02.01. CAPITAL COSTS						
USR CC 8 hr Rad Worker Trng Refresher		0.00	0.00	0.00	200.00	200.00
	218.00 EA	0	0	0	43,600	43,600
USR CC 8 hr Haz Wst Trng Refresher		0.00	0.00	0.00	130.00	130.00
	218.00 EA	0	0	0	28,340	28,340
04.01.02.02. EXPENSES						
04.01.02.03. OPERATIONS AND MAINTENANCE						
04.01.03. SITE PREPARATION						
04.01.03.01. CAPITAL COSTS						
04.01.03.02. EXPENSES						
04.01.03.03. OPERATIONS AND MAINTENANCE						
04.01.04. SITE MOBILIZATION						
04.01.04.01. CAPITAL COSTS						
04.01.04.02. EXPENSES						
04.01.04.03. OPERATIONS AND MAINTENANCE						
PRE-CONSTRUCTION		0	0	0	71,940	71,940

04.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST

04.02. EXCAVATION/DEMOLITION
The following sites will be ecavated during FY 99.
*116-C-5, 116-B-1, 132-B-6, 132-C-2, *126-B-1, 1607-B-9, 1607-B-8, 1607-B-11, 1607-B-10, *116-B-1, 118-C-1, 118-B-1.
* Indicates excavation will occur in more than one fiscal year.

04.02.01. EXCAVATION/DEMOLITION

04.02.01.01. CAPITAL COSTS

Item	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA 150,000 lb excavator		0.00	0.00	14214.87	0.00	14214.87
2 excavators for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	24.00 MO	0	0	459,407	0	459,407
USR AA 200,000 lb excavator (3 yr)		0.00	0.00	28828.00	0.00	28828.00
1 excavator for 12 months. Based on a 3 yr lease purchase plan. Price quote from McDonald Industries Komatsu.	12.00 MO	0	0	465,843	0	465,843
USR AA 520 hp dozer		0.00	0.00	13326.49	0.00	13326.49
1 for dust suppression and 2 for stockpile management @ 12 mo each. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	36.00 MO	0	0	646,043	0	646,043
USR AA 375 hp front end loader		0.00	0.00	9783.78	0.00	9783.78
1 loader for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO	0	0	158,100	0	158,100
USR AA 150,000 lb excavator (4 yr)		0.00	0.00	17105.80	0.00	17105.80
4 excavators for 12 months each. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	48.00 MO	0	0	1,105,676	0	1,105,676
USR AA 51" Mobile shears		0.00	0.00	312000.00	0.00	312000.00
Based on quote from LaBounty.	1.00 EA	0	0	420,144	0	420,144
USR AA Crusting Agent		0.00	0.00	0.00	2.50	2.50
Based on a quote from Soil Sement. Applicaton done by water tanks and trucks.	6250.00 GAL	0	0	0	21,041	21,041

04.02. EXCAVATION/DEMOLITION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
04.02.01.02. EXPENSES							
04.02.01.03. OPERATIONS AND MAINTENANCE							
USR AC Medium sites with E1 crew			0.02	0.46	0.19	0.00	0.65
E1 crew consists of:	27764 CY	JEXC1	431	17,178	7,154	0	24,332
1 Equipment operator							
1 Laborer							
.5 Foreman							
1 HPT							
1 Hydraulic excavator							
Production rate = 343 cy/hr							
USR AC Excavation of overburden & ramp			0.02	0.53	0.31	0.00	0.83
with E-2 crew.	100675 CY	JEXC2	1,807	71,301	41,710	0	113,012
E2 crew consists of:							
2 Equipment operators							
1 Laborer							
.5 Foremen							
1 HPT							
1 Bulldozer							
1 Front End Loader							
Production rate = 381 cy/hr							
USR AC Excavation with grapples E-3			0.02	0.55	0.25	0.00	0.80
E3 crew consists of:	40170 CY	JEXC3	747	29,807	13,374	0	43,181
1 Equipment operator							
1 Laborer							
.5 Foreman							
1 HPT							
1 Hydraulic excavator with grapples							
Production rate = 286 cy/hr							
USR AC Metals loading with E3 crew			0.03	0.92	0.41	0.00	1.34
E3 crew consists of:	41847 TON	JEXC3	1,302	51,934	23,302	0	75,236
1 Equipment operator							
1 Laborer							
.5 Foreman							
1 HPT							
1 Hydraulic excavator with grapples							
Production rate = 171 tons/hr							

04.02. EXCAVATION/DEMOLITION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Burial grounds with E3 crew			0.03	0.83	0.37	0.00	1.20
E3 crew consist of:	287475 CY	JEXC3	8,049	321,091	144,069	0	465,160
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 190 cy/hr							
USR AC Concrete Exc/Demo with E-4			0.14	4.15	3.74	0.00	7.89
E4 crew consists of:	1663.00 CY	JEXC4	233	9,287	8,377	0	17,665
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic Excavator with concrete processing equipment Production rate = 38 cy/hr							
USR AC Exc/Demo with mobile shears, E-5			0.28	8.29	7.32	0.00	15.61
E5 crew consists of:	2026.00 TON	JEXC5	567	22,629	19,972	0	42,601
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with mobile shears Production rate = 19 tons/hr							
USR AC E-4 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-4 crew will have 51.35 down days * 8 hrs per day = 410.8 hrs USE 411 hrs.	411.00 HR	JEXSB4	1,439	57,383	0	0	57,383
USR AC E-3 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-3 crew will have 192.5 down days * 8 hrs per day = 1540 hrs.	1540.00 HR	JEXSB3	5,390	215,010	0	0	215,010
USR AC E-2 crew standby (weather delay)			4.50	131.83	0.00	0.00	131.83
It is estimated the E-2 crew will be down for 92 days * 8 hrs per day = 736 hrs.	736.00 HR	JEXSB2	3,312	130,658	0	0	130,658

04.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC E-1 crew standby (weather delay)		3.50	103.68	0.00	0.00	103.68
It is estimated the E-1 crew will be down for 77.5 days * 8 hrs per day = 620 hrs.	620.00 HR JEXSB1	2,170	86,563	0	0	86,563
USR AC Large sites with E1 crew		0.01	0.41	0.17	0.00	0.59
E1 crew consists of: 1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic Excavator Production Rate = 381 cy/hr	248319 CY JEXC1	3,467	138,314	57,601	0	195,915
USR AC Large sites with E-2 crew		0.02	0.53	0.31	0.00	0.83
E2 crew consists of: 2 Equipment operators 1 Laborer .5 Foreman 1 HPT 1 Bulldozer 1 Front end loader Production rate = 381 cy/hr	372478 CY JEXC2	6,687	263,801	154,320	0	418,121
USR AC Concrete loading with E-3 crew		0.02	0.55	0.25	0.00	0.80
E3 crew consists of: 1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 286 cy/hr	1663.00 CY JEXC3	31	1,234	554	0	1,788
USR AC Metals Exc/Demo with E-4		0.28	8.29	7.48	0.00	15.78
E4 crew consists of: 1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic exavator with concrete processing equipment Production rate = 19 ton/hr	24831 TON JEXC4	6,953	277,346	250,168	0	527,514

04.02. EXCAVATION/DEMOLITION	QUANTY	UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Spoil pile dust suppression				0.00	0.00	17.35	0.00	17.35
Consists of 1-8,000 gallon water tank and sprinkler. Will need to be operated 250 days/yr, 8 hrs/shift * 2 shifts = 4000 hrs.	4000.00	HR	JDST1	0	0	93,455	0	93,455
USR AC Excavation dust suppression				4.00	111.36	52.16	0.00	163.52
Consists of 1 water truck with driver for each active excavation. 2080 hrs/yr/shift * 2 shift = 4160 hrs.	4160.00	HR	JDST3	16,640	623,830	292,220	0	916,049
USR AC Spoil Pile Management				1.00	28.62	48.32	0.00	76.94
Crew consists of 2 bulldozers with equipment operators. 2 crews/shift * 2080 hrs/yr * 2 shifts = 8320 hrs.	8320.00	HR	JMSCL7	8,320	320,654	541,354	0	862,008
USR AC E-5 crew standby				3.50	103.68	0.00	0.00	103.68
It is estimated the E-5 crew will be down for 20 days * 8 hrs per day = 160 hrs.	160.00	HR	JEXSB5	560	22,339	0	0	22,339
EXCAVATION/DEMOLITION				68,105	2,660,359	4,902,842	21,041	7,584,242
04.03. TRANSPORTATION								
04.03.01. RAIL								
04.03.01.01. CAPITAL COSTS								
USR AA Locomotives				0.00	0.00	16056.19	0.00	16056.19
2 locomotives for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Morrison Knudsen Locomotives division for a refurbished locomotive.	24.00	MO		0	0	518,916	0	518,916
04.03.01.02. EXPENSES								
04.03.01.03. OPERATIONS AND MAINTENANCE								
USR OM Railroad track maintenance				0.00	0.00	0.00	20000.00	20000.00
Track maintenance will be provided as a service from WHC for $20,000 per mile.	19.00	MI		0	0	0	380,000	380,000

04.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR OM Locomotive operations			4.00	109.76	107.55	0.00	217.31
Crew consists of 3 locomotive operators and 1 broker. Locomotive needs to be operating every day of operations = 2080 hrs * 2 shifts = 4160 hrs.	4160.00 HR	JTRNS3	16,640	456,602	447,408	0	904,010
USR OM Rail Maintenance Facility M&O			0.00	0.00	960000.00	0.00	960000.00
Price based on direction from WHC.	1.00 YR		0	0	960,000	0	960,000
04.03.02. ROAD							
04.03.02.01. CAPITAL COSTS							
USR AA 275 hp motor grader			0.00	0.00	7969.35	0.00	7969.35
1 grader for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	128,780	0	128,780
USR AA Trailers			0.00	0.00	995.89	0.00	995.89
20 trailers for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Red River Trailers.	240.00 MO		0	0	321,859	0	321,859
USR AA Trucks			0.00	0.00	4102.72	0.00	4102.72
20 trucks for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Kenworth.	240.00 MO		0	0	1,325,948	0	1,325,948
USR AA Roadbase Stockpile			0.00	0.00	0.00	12.50	12.50
Gravel losses due to regrading during the course of the year. Material prices based on $12.50/cy.	4318.00 CY		0	0	0	72,684	72,684
USR AA 84" Wide Vibratory Roller			0.00	0.00	2577.00	0.00	2577.00
1 roller for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	41,643	0	41,643

04.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
04.03.02.02. EXPENSES							
04.03.02.03. OPERATIONS AND MAINTENANCE							
USR TR Truck operations			0.04	1.16	1.58	0.00	2.73
Truck crew consists of tractor trailer combination with driver. Production rate = 37.1 cy/hr	1076881 CY	JTRNS1	44,120	2,027,336	2,763,526	0	4,790,862
USR AC Road crew operations			2.00	56.76	34.44	0.00	91.20
Crew consists of Motor grader and Water truck with operators. Operates 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JMSCL12	8,320	317,965	192,923	0	510,888
04.03.03. CONTAINERS							
04.03.03.01. CAPITAL COSTS							
USR AA Container handlers			0.00	0.00	8698.79	0.00	8698.79
2 handlers for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Washington Liftruck.	24.00 MO		0	0	281,134	0	281,134
04.03.03.02. EXPENSES							
04.03.03.03. OPERATIONS AND MAINTENANCE It is esimated 105 containers will be operating at any one time.							
USR AC Container Maintenance			0.00	0.00	378.00	0.00	378.00
Hourly cost for maintaining containers. Container used only during excavation hours = 200 days/yr, 5.25 hrs/shift * 2 shifts = 2100 hrs.	2100.00 HR	JTRNS4	0	0	1,068,943	0	1,068,943
USR AC Container Transfer			2.00	56.42	28.99	0.00	85.41
Container loading occurs throughout the year = 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JTRNS5	8,320	316,060	162,384	0	478,444
TRANSPORTATION			77,400	3,117,963	8,213,464	452,684	11,784,111

04.04. ANCILLARY	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
04.04. ANCILLARY							
04.04.01. EQUIPMENT DECON FACILITY							
04.04.01.01. CAPITAL COSTS							
04.04.01.02. EXPENSES							
04.04.01.03. OPERATIONS AND MAINTENANCE							
USR AC Equipment Decon Operations			1.00	25.38	0.00	0.00	25.38
Crew consists of 1 operator. Operations based on 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JMSCL11	4,160	142,177	0	0	142,177
USR OM Equipment Decon Maintenance			0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance and all utilities.	1440.00 SF		0	0	0	51,480	51,480
04.04.02. SURVEY STATION							
04.04.02.01. CAPITAL COSTS							
04.04.02.02. EXPENSES							
04.04.02.03. OPERATIONS AND MAINTENANCE It-is estimated that two stations will each be operated by 4 HPT's with equipment. The stations will be operated 250 days per year 8 hrs per shift = 2000 hrs per year per shift plus holidays = 2080 hrs. 2080 hrs * 2 crews/shift * 2 shifts = 8320 hrs.							
USR AC Survey station			4.00	144.48	0.00	0.00	144.48
	8320.00 HR	JFRSK1	33,280	1,618,730	0	0	1,618,730
04.04.03. OFFICE AREA							
04.04.03.01. CAPITAL COSTS							
04.04.03.02. EXPENSES							
USR AB Office Supplies and Equipment			0.00	0.00	0.00	25000.00	25000.00
Assume and annual cost of $25,000.	1.00 EA		0	0	0	33,665	33,665

04.04. ANCILLARY	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
04.04.03.03. OPERATIONS AND MAINTENANCE						
USR OM Waste Removal		0.00	0.00	0.07	0.00	0.07
13,261 gallons/day * 250 days/yr = 3,315,250. Provided as a service from WHC at a rate of $135/2000 gal = $0.0675/gal. For removal of liquid wastes from sanitary holding tanks.	3315250 GAL	0	0	232,068	0	232,068
USR OM Office Maintenance		0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr Includes facility maintenance, utilities, and janitorial. Based on 24'x48'= 1152 sf command control station, 28'x60'= 1680 sf lunchroom, and 42'x70'=2940 sf general support area. Total = 5772 sf. Provided as a service from WHC.	5772.00 SF	0	0	0	206,349	206,349
USR OM Change Trailer Maintenance		0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance, all utilities, and janitorial. Based on 14'x60' = 840 sf female trailer and a 28'x60' = 1680 sf male trailer. Total = 2520 sf.	2520.00 SF	0	0	0	90,090	90,090
USR OM Telephone		0.00	0.00	0.00	1247.40	1247.40
$103.95/line/mo * 12 mo = $1247.4/line/yr. Assume one line to both offices and one to the lunchroom. Total = 3 lines	3.00 EA	0	0	0	3,742	3,742
04.04.04. PERSONNEL DECON/CHANGE AREA						
04.04.04.01. CAPITAL COSTS						
04.04.04.02. EXPENSES						
04.04.04.03. OPERATIONS AND MAINTENANCE						
USR OM Maintenance		0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance and all utilities. Based on 2-14'x56'= 1568 sf decontamination trailers.	1568.00 SF	0	0	0	56,056	56,056

04.04 ANCILLARY	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
04.04.05. RECEIVING AREA/WAREHOUSE						
04.04.05.01. CAPITAL COSTS						
04.04.05.02. EXPENSES						
04.04.05.03. [illegible]ATIONS AND MAINTENANCE						
04.04.06. UTILIT[illegible]						
04.04.06.01. CAPITAL COSTS						
04.04.06.02. EXPENSES						
USR EP Potable Water Testing		0.00	0.00	0.00	2000.00	2000.00
Based on a quote from WHC as a service.	1.00 EA	0	0	0	2,000	2,000
04.04.06.03. OPERATIONS AND MAINTENANCE						
ANCILLARY		37,440	1,760,907	232,068	443,383	2,436,357
04.05. SUPPORT						
04.05.01. SUPPORT						
04.05.01.01. CAPITAL COSTS						
04.05.01.02. EXPENSES						
MIL AB Area Supervisors		0.00	0.00	0.00	5000.00	5000.00
5 area supervisor per shift. 5/shift * 12 mo * 2 shifts = 120 mo.	120.00 MON N/A	0	0	0	807,969	807,969
MIL AB Clerks		0.00	0.00	0.00	1700.00	1700.00
1 clerk /shift * 2 shifts * 12 mo = 24 mo.	24.00 MO N/A	0	0	0	54,942	54,942
MIL AB Network Administrator		0.00	0.00	0.00	4200.00	4200.00
1 administrator/shift * 2 shifts * 12 mo = 24 mo.	24.00 MON N/A	0	0	0	135,739	135,739
MIL AB Project Engineer		0.00	0.00	0.00	4700.00	4700.00
5 engineers/shift * 2 shifts * 12 mo = 120 mo.	120.00 MON N/A	0	0	0	759,491	759,491
MIL AB Site Safety and QA		0.00	0.00	0.00	3800.00	3800.00
1 engineer/shift * 2 shift * 12 mo = 24 mo.	24.00 MON N/A	0	0	0	122,811	122,811

04.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR EP Medic support		4160.00	100000.00	0.00	0.00	100000.00
2 medics onsite. 2 medics onsite during all operating times.	2.00 YR	8,320	200,000	0	0	200,000
USR EP Laundry Service (yrs 2-5)		0.00	0.00	0.00	1350000.00	1350000.00
Based on 194 people changing 4 times a day for whites and 1 time a day for blues. Each change for whites weighs 3.02# and each change for blues 2#.	1.00 EA	0	0	0	1,350,000	1,350,000
USR EP Dosimetry		0.00	0.00	0.00	375.00	375.00
$200/yr for dosimetry and $175/yr for whole body count. Total = $375/yr. 218 people need dosimetry the second through the fifth year.	218.00 EA	0	0	0	81,750	81,750
USR EP Radio Maintenance		0.00	0.00	0.00	64.50	64.50
Assume 1 radio technician supporting the remediation charging out at $64.50/hr with 2080 hrs/yr.	2080.00 HR	0	0	0	134,160	134,160
USR EP Mask Service		0.00	0.00	0.00	240.48	240.48
$20.04/mo * 12 mo = $240.48/yr Assume the excavation crew will be in masks 25% of the time. Need 4 mask changes per day. 22 people @ 25% * 4/shift = 22 masks/shift * 2 shifts = 44.	44.00 EA	0	0	0	10,581	10,581
MIL AB General Superintendent (P.M.)		0.00	0.00	0.00	5300.00	5300.00
	12.00 MON N/A	0	0	0	85,645	85,645
USR EP Garbage		0.00	0.00	0.00	10000.00	10000.00
Assume garbage collection will be $10,000 per year.	1.00 EA	0	0	0	10,000	10,000
USR EP Transport Vehicle Maintenance		0.00	0.00	0.00	2000.00	2000.00
Assume $2,000 per vehicle per year for maintenance at the 200 Area vehicle maintenance shop.	30.00 EA	0	0	0	60,000	60,000
USR EP Field Instrument Maintenance		0.00	0.00	0.00	64.50	64.50
Assume one technician supporting the project charging out @ $64.50/hr. Provided as a service by WHC.	2080.00 HR	0	0	0	134,160	134,160

04.05. SUPPORT	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST

2080 hrs.

04.05.01.03. OPERATIONS AND MAINTENANCE

It is estimated the excavation sites will need 2 sets of lights per excavation and on the average 3 sites will be operated at one time throughtout the fiscal year = 6 sets of lights.

It is estimated the lights will be operated from 4 pm to 7 am 4 months of the year and 7 pm to 7 am 8 months per year.
15 hrs/day * 20.83 days/mo * 4 mo/yr = 1250 hrs/yr.
12 hrs/day * 20.83 days/mo * 8 mo/yr = 2000 hrs/yr.
Total = 3250 hrs/yr.
6 sets * 3250 hrs/yr = 19500 hrs.

	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Lighting with gen set			0.00	0.00	3.98	0.00	3.98
	19500 HR	JFLITE	0	0	104,511	0	104,511
USR AC Lid replacement/removal			1.00	27.30	7.83	0.00	35.13
Crew consists of 1 forklift with operator. Operations based on 2080 hrs/yr * 2 shifts = 4160 hrs.	4160.00 EA	JMSCL10	4,160	152,932	43,850	0	196,782
USR AC Classification operating crew			2.00	50.16	0.00	0.00	50.16
Crew consists of 2 operators. Operations based on 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JMSCL9	8,320	280,992	0	0	280,992
USR AC Offshift operations			8.00	230.97	89.81	0.00	320.78
Crew consists of : 1 HPT 1 Foreman Road crew 1 Grader with operator 1 Compactor with operator 1 Water truck with operator 1 Flatbed truck with driver Decon waste removal 1 Vacuum truck with operator Water refill 1 Water truck with operator Operations based on 2080 hrs/yr/shift * 1 shift = 2080 hrs.	2080.00 HR	JMSCL13	16,640	646,938	251,563	0	898,500
USR AC Miscellaneous Laborers			3.00	75.24	9.50	0.00	84.74
Crew consists of 3 laborers with pickups. Operation based on 2080 hrs/yr/shift	4160.00 HR	JMSCL8	12,480	421,488	53,192	0	474,681

04.05. SUPPORT	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR OM Septic Service			0.00	0.00	0.00	14729.00	14729.00
Cost for supplying and servicing 17 porta-potties. Service provided by WHC.	1.00 YR		0	0	0	14,729	14,729
USR AC Sample Transport			1.00	24.99	3.18	0.00	28.17
Crew consists of one truck driver with pickup. Will pick up samples from the excavations and transport them to the lab for analysis. 2080 hrs/yr/shift * 2 shift/day = 4160 hrs.	4160.00 HR	JMSCL6	4,160	139,992	17,821	0	157,813
SUPPORT			54,080	1,842,342	470,936	3,761,977	6,075,256
04.06. RECLAMATION							
04.06.01. RECONTOUR/BACKFILL							
04.06.01.01. CAPITAL COSTS							
USR AA Compacter, 4 yr			0.00	0.00	9514.06	0.00	9514.06
2 compacters for 12 months each. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	24.00 MO		0	0	307,483	0	307,483
USR AA Loader, 4 yr.			0.00	0.00	11771.71	0.00	11771.71
1 loader for 12 months. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	190,224	0	190,224
USR AA Dozer, 4 yr.			0.00	0.00	16034.92	0.00	16034.92
1 dozer for 12 months. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	259,114	0	259,114
04.06.01.02. EXPENSES							
04.06.01.03. OPERATIONS AND MAINTENANCE							
USR AC Backfill (loader w/ 3 trucks)			0.00	0.11	0.12	0.00	0.23
	196073 CY	JRCNTR5	742	28,232	31,652	0	59,884
USR AC Backfill (dozer), 379 cy/hr			0.01	0.34	0.38	0.00	0.72
	28315 CY	JRCNTR3	341	12,983	14,362	0	27,345

04.06. RECLAMATION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
04.06.02. REVEGETATION						
04.06.02.01. CAPITAL COSTS						
04.06.02.02. EXPENSES						
04.06.02.03. OPERATIONS AND MAINTENANCE						
04.06.03. DECONTAMINATION/DISPOSAL						
04.06.03.01. CAPITAL COSTS						
04.06.03.02. EXPENSES						
04.06.03.03. OPERATIONS AND MAINTENANCE						
RECLAMATION		1,083	41,214	802,835	0	844,050
FY 1999		238,108	9,422,786	14,622,145	4,751,024	28,795,955

05.01. PRE-CONSTRUCTION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
05. FY 2000						
05.01. PRE-CONSTRUCTION						
05.01.01. PROCUREMENT						
05.01.01.01. CAPITAL COSTS						
05.01.01.02. EXPENSES						
05.01.01.03. OPERATIONS AND MAINTENANCE						
05.01.02. TRAINING						
05.01.02.01. CAPITAL COSTS						
USR CC 8 hr Rad Worker Trng Refresher		0.00	0.00	0.00	200.00	200.00
	218.00 EA	0	0	0	43,600	43,600
USR CC 8 hr Haz Wst Trng Refresher		0.00	0.00	0.00	130.00	130.00
	218.00 EA	0	0	0	28,340	28,340
05.01.02.02. EXPENSES						
05.01.02.03. OPERATIONS AND MAINTENANCE						
05.01.03. SITE PREPARATION						
05.01.03.01. CAPITAL COSTS						
05.01.03.02. EXPENSES						
05.01.03.03. OPERATIONS AND MAINTENANCE						
05.01.04. SITE MOBILIZATION						
05.01.04.01. CAPITAL COSTS						
05.01.04.02. EXPENSES						
05.01.04.03. OPERATIONS AND MAINTENANCE						
PRE-CONSTRUCTION		0	0	0	71,940	71,940

05.02. EXCAVATION/DEMOLITION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST

05.02. EXCAVATION/DEMOLITION
The following sites will be excavated during FY 00:
*Effluent pipelines, 118-B-2, *118-B-3, *128-B-3, *116-C-5, *118-B-1.
* Indicates excavation will occur in more than one fiscal year.

05.02.01. EXCAVATION/DEMOLITION

05.02.01.01. CAPITAL COSTS

05.02. EXCAVATION/DEMOLITION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA 150,000 lb excavator (5 yr)			0.00	0.00	14214.87	0.00	14214.87
2 excavators for 12 months each. Based on 5 yr lease purchase plan. Price quote from Western States Caterpillar.	24.00 MO		0	0	459,407	0	459,407
USR AA 200,000 lb excavator (3 yr)			0.00	0.00	28828.00	0.00	28828.00
1 excavator for 12 months. Based on 3 yr lease purchase plan. Price quote from McDonald Industries Komatsu.	12.00 MO		0	0	465,843	0	465,843
USR AA 520 hp dozer			0.00	0.00	13326.49	0.00	13326.49
1 for excavation and 2 for spoilpile management @ 12 mo each. Based on 5 yr lease purchase plan. Price quote from Western States Caterpillar.	36.00 MO		0	0	646,043	0	646,043
USR AA 375 hp front end loader			0.00	0.00	9783.78	0.00	9783.78
1 loader for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	158,100	0	158,100
USR AA 150,000 lb excavator (4 yr)			0.00	0.00	17105.80	0.00	17105.80
4 excavators for 12 months each. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	48.00 MO		0	0	1,105,676	0	1,105,676
USR AA Crusting Agent			0.00	0.00	0.00	2.50	2.50
Based on quote from Soil Sement. Application done by water tanks and trucks.	6250.00 GAL		0	0	0	21,041	21,041

05.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
05.02.01.02. EXPENSES						
05.02.01.03. OPERATIONS AND MAINTENANCE						
USR AC Medium sites with E1 crew		0.02	0.46	0.19	0.00	0.65
E1 crew consists of:	162012 CY JEXC1	2,513	100,239	41,744	0	141,983
1 Equipment operator						
1 Laborer						
.5 Foreman						
1 HPT						
1 Hydraulic excavator						
Production rate = 343 cy/hr						
USR AC Excavation of overburden & ramp		0.02	0.53	0.31	0.00	0.83
with E-2 crew.	372795 CY JEXC2	6,693	264,026	154,451	0	418,477
E2 crew consists of:						
2 Equipment operators						
1 Laborer						
.5 Foremen						
1 HPT						
1 Bulldozer						
1 Front End Loader						
Production rate = 381 cy/hr						
USR AC Metals loading with E3 crew		0.03	0.92	0.41	0.00	1.34
E3 crew consists of:	34490 TON JEXC3	1,073	42,803	19,205	0	62,009
1 Equipment operator						
1 Laborer						
.5 Foreman						
1 HPT						
1 Hydraulic excavator with grapples						
Production rate = 171 tons/hr						
USR AC Burial grounds with E3 crew		0.03	0.83	0.37	0.00	1.20
E3 crew consist of:	155580 CY JEXC3	4,356	173,773	77,969	0	251,742
1 Equipment operator						
1 Laborer						
.5 Foreman						
1 HPT						
1 Hydraulic excavator with grapples						
Production rate = 190 cy/hr						
USR AC Concrete Exc/Demo with E-4		0.14	4.15	3.74	0.00	7.89
E4 crew consists of:	410.00 CY JEXC4	57	2,290	2,065	0	4,355
1 Equipment operator						

05.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
1 Laborer .5 Foreman 1 HPT 1 Hydraulic Excavator with concrete processing equipment Production rate = 38 cy/hr						
USR AC Exc/Demo with mobile shears, E-5		0.28	8.29	7.32	0.00	15.61
E5 crew consists of: 1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with mobile shears Production rate = 19 tons/hr	2207.00 TON JEXC5	618	24,651	21,756	0	46,407
USR AC E-1 crew standby (weather delay)		3.50	103.68	0.00	0.00	103.68
It is estimated the E-1 crew will be down for 77.5 days * 8 hrs per day = 620 hrs.	620.00 HR JEXSB1	2,170	86,563	0	0	86,563
USR AC E-2 crew standby (weather delay)		4.50	131.83	0.00	0.00	131.83
It is estimated the E-2 crew will be down for 76 days * 8 hrs per day = 608 hrs.	608.00 HR JEXSB2	2,736	107,935	0	0	107,935
USR AC E-3 crew standby (weather delay)		3.50	103.68	0.00	0.00	103.68
It is estimated the E-3 crew will have 156 down days * 8 hrs per day = 1248 hrs.	1248.00 HR JEXSB3	4,368	174,242	0	0	174,242
USR AC E-4 crew standby (weather delay)		3.50	103.68	0.00	0.00	103.68
It is estimated the E-4 crew will have 100 down days * 8 hrs per day = 800 hrs.	800.00 HR JEXSB4	2,800	111,694	0	0	111,694
USR AC Large sites with E1 crew		0.01	0.41	0.17	0.00	0.59
E1 crew consists of: 1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic Excavator Production Rate = 381 cy/hr	159142 CY JEXC1	2,222	88,642	36,915	0	125,558

05.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Large sites with E-2 crew		0.02	0.53	0.31	0.00	0.83
E2 crew consists of:	238713 CY JEXC2	4,286	169,064	98,900	0	267,964
2 Equipment operators						
1 Laborer						
.5 Foreman						
1 HPT						
1 Bulldozer						
1 Front end loader						
Production rate = 381 cy/hr						
USR AC Metals Exc/Demo with E-4		0.28	8.29	7.48	0.00	15.78
E4 crew consists of:	35061 TON JEXC4	9,817	391,609	353,233	0	744,842
1 Equipment operator						
1 Laborer						
.5 Foreman						
1 HPT						
1 Hydraulic exavator with concrete processing equipment						
Production rate = 19 ton/hr						
USR AC Concrete loading with E-3 crew		0.02	0.55	0.25	0.00	0.80
E3 crew consists of:	410.00 CY JEXC3	8	304	137	0	441
1 Equipment operator						
1 Laborer						
.5 Foreman						
1 HPT						
1 Hydraulic excavator with grapples						
Production rate = 286 cy/hr						
USR AC Spoil pile dust suppression		0.00	0.00	17.35	0.00	17.35
Consists of 1-8,000 gallon water tank and sprinkler. Will need to be operated 250 days/yr, 8 hrs/shift * 2 shifts = 4000 hrs.	4000.00 HR JDST1	0	0	93,455	0	93,455
USR AC Excavation dust suppression		4.00	111.36	52.16	0.00	163.52
Consists of 1 water truck with driver for each active excavation. 2080 hrs/yr/shift * 2 shift = 4160 hrs.	4160.00 HR JDST3	16,640	623,830	292,220	0	916,049
USR AC Spoil Pile Management		1.00	28.62	48.32	0.00	76.94
Crew consists of 2 bulldozers with equipment operators.	8320.00 HR JMSCL7	8,320	320,654	541,354	0	862,008

05.02. EXCAVATION/DEMOLITION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
2 crews/shift * 2080 hrs/yr * 2 shifts = 8320 hrs.							
EXCAVATION/DEMOLITION			68,677	2,682,318	4,568,474	21,041	7,271,833
05.03. TRANSPORTATION							
05.03.01. RAIL							
05.03.01.01. CAPITAL COSTS							
USR AA Locomotives			0.00	0.00	16056.19	0.00	16056.19
2 locomotives for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Morrison Knudsen Locomotives division for a refurbished locomotive.	24.00 MO		0	0	518,916	0	518,916
05.03.01.02. EXPENSES							
05.03.01.03. OPERATIONS AND MAINTENANCE							
USR OM Railroad track maintenance			0.00	0.00	0.00	20000.00	20000.00
Track maintenance will be provided as a service from WHC for $20,000 per mile.	19.00 MI		0	0	0	380,000	380,000
USR OM Locomotive operations			4.00	109.76	107.55	0.00	217.31
Crew consists of 3 locomotive operators and 1 broker. Locomotive needs to be operating every day of operations = 2080 hrs * 2 shifts = 4160 hrs.	4160.00 HR	JTRNS3	16,640	456,602	447,408	0	904,010
USR OM Rail Maintenance Facility M&O			0.00	0.00	960000.00	0.00	960000.00
Price based on direction from WHC.	1.00 YR		0	0	960,000	0	960,000
05.03.02. ROAD							
05.03.02.01. CAPITAL COSTS							
USR AA 275 hp motor grader			0.00	0.00	7969.35	0.00	7969.35
1 grader for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	128,780	0	128,780

05.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA Trailers			0.00	0.00	995.89	0.00	995.89
20 trailers for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Red River Trailers.	240.00 MO		0	0	321,859	0	321,859
USR AA Trucks			0.00	0.00	4102.72	0.00	4102.72
20 trucks for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Kenworth.	240.00 MO		0	0	1,325,948	0	1,325,948
USR AA Roadbase Stockpile			0.00	0.00	0.00	12.50	12.50
Gravel losses due to regrading during the course of the year. Material prices based on $12.50/cy.	4318.00 CY		0	0	0	72,684	72,684
USR AA 84" Wide Vibratory Roller			0.00	0.00	2577.00	0.00	2577.00
1 roller for 12 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	41,643	0	41,643
05.03.02.02. EXPENSES							
05.03.02.03. OPERATIONS AND MAINTENANCE							
USR TR Truck operations			0.04	1.16	1.58	0.00	2.73
Truck crew consists of tractor trailer combination with driver. Production rate = 37.1 cy/hr	1088243 CY	JTRNS1	44,586	2,048,726	2,792,683	0	4,841,409
USR AC Road crew operations			2.00	56.76	34.44	0.00	91.20
Crew consists of Motor grader and Water truck with operators. Operates 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JMSCL12	8,320	317,965	192,923	0	510,888
05.03.03. CONTAINERS							
05.03.03.01. CAPITAL COSTS							
USR AA Container handlers			0.00	0.00	8698.79	0.00	8698.79
2 handlers for 12 months each. Based on a 5 yr lease purchase plan. Price quote from Washington Liftruck.	24.00 MO		0	0	281,134	0	281,134

05.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
05.03.03.02. EXPENSES							
05.03.03.03. OPERATIONS AND MAINTENANCE It is estimated 105 containers will be operating at any one time.							
USR AC Container Maintenance			0.00	0.00	378.00	0.00	378.00
Container used only during excavation hours = 200 days/yr, 5.25 hrs/shift * 2 shifts = 2100 hrs.	2100.00 HR	JTRNS4	0	0	1,068,943	0	1,068,943
USR AC Container Transfer			2.00	56.42	28.99	0.00	85.41
Container loading occurs throughout the year = 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JTRNS5	8,320	316,060	162,384	0	478,444
TRANSPORTATION			77,866	3,139,353	8,242,622	452,684	11,834,658
05.04. ANCILLARY							
05.04.01. EQUIPMENT DECON FACILITY							
05.04.01.01. CAPITAL COSTS							
05.04.01.02. EXPENSES							
05.04.01.03. OPERATIONS AND MAINTENANCE							
USR AC Equipment Decon Operations			1.00	25.38	0.00	0.00	25.38
Crew consists of 1 operator. Operations based on 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JMSCL11	4,160	142,177	0	0	142,177
USR OM Equipment Decon Maintenance			0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance and all utilities.	1440.00 SF		0	0	0	51,480	51,480
05.04.02. SURVEY STATION							
05.04.02.01. CAPITAL COSTS							
05.04.02.02. EXPENSES							

05.04. ANCILLARY	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
05.04.02.03. OPERATIONS AND MAINTENANCE It is estimated two stations will each be manned by 4 HPT's with equipment. The stations will be operated 250 days per year 8 hrs per shift = 2000 hrs per year per shift plus holidays = 2080 hrs. 2080 hrs * 2 crews/shift * 2 shifts = 8320 hrs.							
USR AC Survey station			4.00	144.48	0.00	0.00	144.48
	8320.00 HR	JFRSKI	33,280	1,618,730	0	0	1,618,730
05.04.03. OFFICE AREA							
05.04.03.01. CAPITAL COSTS							
05.04.03.02. EXPENSES							
USR A8 Office Supplies and Equipment			0.00	0.00	0.00	25000.00	25000.00
Assume and annual cost of $25,000.	1.00 EA		0	0	0	33,665	33,665
05.04.03.03. OPERATIONS AND MAINTENANCE							
USR OM Waste Removal			0.00	0.00	0.07	0.00	0.07
13,261 gallons/day * 250 days/yr = 3,315,250. Provided as a service from WHC at a rate of $135/2000 gal = $0.0675/gal. For removal of liquid wastes from sanitary holding tanks.	3315250 GAL		0	0	232,068	0	232,068
USR OM Office Maintenance			0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr Includes facility maintenance, utilities, and janitorial. Based on 24'x48'= 1152 sf command control station, 28'x60'= 1680 sf lunchroom, and 42'x70'=2940 sf general support area. Total = 5772 sf. Provided as a service from WHC.	5772.00 SF		0	0	0	206,349	206,349
USR OM Change Trailer Maintenance			0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance, all utilities, and janitorial. Based on 14'x60' = 840 sf female trailer and a 28'x60' = 1680 sf male trailer. Total = 2520 sf.	2520.00 SF		0	0	0	90,090	90,090

05.04. ANCILLARY	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR OM Telephone		0.00	0.00	0.00	1247.40	1247.40
$103.95/line/mo * 12 mo = $1247.4/line/yr. Assume one line to both offices and one to the lunchroom. Total = 3 lines	3.00 EA	0	0	0	3,742	3,742
05.04.04. PERSONNEL DECON/CHANGE AREA						
05.04.04.01. CAPITAL COSTS						
05.04.04.02. EXPENSES						
05.04.04.03. OPERATIONS AND MAINTENANCE						
USR OM Maintenance		0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance and all utilities. Based on 2-14'x56'= 1568 sf decontamination trailers.	1568.00 SF	0	0	0	56,056	56,056
05.04.05. RECEIVING AREA/WAREHOUSE						
05.04.05.01. CAPITAL COSTS						
05.04.05.02. EXPENSES						
05.04.05.03. OPERATIONS AND MAINTENANCE						
05.04.06. UTILITIES						
05.04.06.01. CAPITAL COSTS						
05.04.06.02. EXPENSES						
USR EP Potable Water Testing		0.00	0.00	0.00	2000.00	2000.00
Based on a quote from WHC as a service.	1.00 EA	0	0	0	2,000	2,000
05.04.06.03. OPERATIONS AND MAINTENANCE						
ANCILLARY		37,440	1,760,907	232,068	443,383	2,436,357

05.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
05.05. SUPPORT						
05.05.01. SUPPORT						
05.05.01.01. CAPITAL COSTS						
05.05.01.02. EXPENSES						
MIL AB Area Supervisors		0.00	0.00	0.00	5000.00	5000.00
5 area supervisor per shift. 5/shift * 12 mo * 2 shifts = 120 mo.	120.00 MON N/A	0	0	0	807,969	807,969
MIL AB Clerks		0.00	0.00	0.00	1700.00	1700.00
1 clerk /shift * 2 shifts * 12 mo = 24 mo.	24.00 MO N/A	0	0	0	54,942	54,942
MIL AB Network Administrator		0.00	0.00	0.00	4200.00	4200.00
1 administrator/shift * 2 shifts * 12 mo = 24 mo.	24.00 MON N/A	0	0	0	135,739	135,739
MIL AB Project Engineer		0.00	0.00	0.00	4700.00	4700.00
5 engineers/shift * 2 shifts * 12 mo = 120 mo.	120.00 MON N/A	0	0	0	759,491	759,491
MIL AB Site Safety and QA		0.00	0.00	0.00	3800.00	3800.00
1 engineer/shift * 2 shift * 12 mo = 24 mo.	24.00 MON N/A	0	0	0	122,811	122,811
USR EP Medic support		4160.00	100000.00	0.00	0.00	100000.00
2 medics onsite @ $50,000/yr.	2.00 YR	8,320	200,000	0	0	200,000
USR EP Laundry Service (yrs 2-5)		0.00	0.00	0.00	1350000.00	1350000.00
Based on 194 people changing 4 times a day for whites and 1 time a day for blues. Each change for whites weighs 3.02# and each change for blues 2#.	1.00 EA	0	0	0	1,350,000	1,350,000
USR EP Dosimetry		0.00	0.00	0.00	375.00	375.00
$200/yr for dosimetry and $175/yr for whole body count. Total = $375/yr. 218 people need dosimetry the second through the fifth year.	218.00 EA	0	0	0	81,750	81,750
USR EP Radio Maintenance		0.00	0.00	0.00	64.50	64.50
Assume 1 radio technician supporting the remediation charging out at $64.50/hr with 2080 hrs/yr.	2080.00 HR	0	0	0	134,160	134,160

05.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR EP Mask Service		0.00	0.00	0.00	240.48	240.48
$20.04/mo * 12 mo = $240.48/yr Assume the excavation crew will be in masks 25% of the time. Need 4 mask changes per day. 22 people @ 25% * 4/shift = 22 masks/shift * 2 shifts = 44.	44.00 EA	0	0	0	10,581	10,581
MIL AB General Superintendent (P.M.)		0.00	0.00	0.00	5300.00	5300.00
	12.00 MON N/A	0	0	0	85,645	85,645
USR EP Transport Vehicle Maintenance		0.00	0.00	0.00	2000.00	2000.00
Assume $2,000 per vehicle per year for maintenance at the 200 Area vehicle maintenance shop.	30.00 EA	0	0	0	60,000	60,000
USR EP Garbage		0.00	0.00	0.00	10000.00	10000.00
Assume garbage collection will be $10,000 per year.	1.00 EA	0	0	0	10,000	10,000
USR EP Field Instrument Maintenance		0.00	0.00	0.00	64.50	64.50
Assume one technician supporting the project charging out @ $64.50/hr. Provided as a service by WHC. 2080 hrs.	2080.00 HR	0	0	0	134,160	134,160

05.05.01.03. OPERATIONS AND MAINTENANCE

It is estimated the excavation sites will need 2 sets of lights per excavation and on the average 3 sites will be operated at one time throughout the fiscal year = 6 sets of lights.

It is estimated the lights will be operated from 4 pm to 7 am 4 months of the year and 7 pm to 7 am 8 months per year.
15 hrs/day * 20.83 days/mo * 4 mo/yr = 1250 hrs/yr.
12 hrs/day * 20.83 days/mo * 8 mo/yr = 2000 hrs/yr.
Total = 3250 hrs/yr.
6 sets * 3250 hrs/yr = 19500

	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Lighting with gen set		0.00	0.00	3.98	0.00	3.98
	19500 HR JFLITE	0	0	104,511	0	104,511
USR AC Lid replacement/removal		1.00	27.30	7.83	0.00	35.13
Crew consists of 1 forklift with operator. Operations based on 2080 hrs/yr * 2 shifts = 4160 hrs	4160.00 HR JMSCL10	4,160	152,932	43,850	0	196,782

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
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05.05. SUPPORT	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Classification operating crew			2.00	50.16	0.00	0.00	50.16
Crew consists of 2 operators. Operations based on 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JMSCL9	8,320	280,992	0	0	280,992
USR AC Offshift operations			8.00	230.97	89.81	0.00	320.78
Crew consists of : 1 HPT 1 Foreman Road crew 1 Grader with operator 1 Compactor with operator 1 Water truck with operator 1 Flatbed truck with driver Decon waste removal 1 Vacuum truck with operator Water refill 1 Water truck with operator Operations based on 2080 hrs/yr/shift * 1 shift = 2080 hrs.	2080.00 HR	JMSCL13	16,640	646,938	251,563	0	898,500
USR AC Miscellaneous Laborers			3.00	75.24	9.50	0.00	84.74
Crew consists of 3 laborers with pickups. Operation based on 2080 hrs/yr/shift	4160.00 HR	JMSCL8	12,480	421,488	53,192	0	474,681
USR OM Septic Service			0.00	0.00	0.00	14729.00	14729.00
Cost for supplying and servicing 17 porta-potties. Service provided by WHC.	1.00 YR		0	0	0	14,729	14,729
USR AC Sample Transport			1.00	24.99	3.18	0.00	28.17
Crew consists of one truck driver with pickup. Will pick up samples from the excavations and transport them to the lab for analysis. 2080 hrs/yr/shift * 2 shift/day = 4160 hrs.	4160.00 HR	JMSCL6	4,160	139,992	17,821	0	157,813
SUPPORT			54,080	1,842,342	470,936	3,761,977	6,075,256

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

05.06. RECLAMATION.	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
05.06. RECLAMATION							
05.06.01. RECONTOUR/BACKFILL							
05.06.01.01. CAPITAL COSTS							
USR AA Dozer, 4 yr.			0.00	0.00	16034.92	0.00	16034.92
1 dozer for 12 months. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	259,114	0	259,114
USR AA Loader, 4 yr.			0.00	0.00	11771.71	0.00	11771.71
1 loader for 12 months. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	190,224	0	190,224
USR AA Compacter, 4 yr			0.00	0.00	9514.06	0.00	9514.06
2 compacters for 12 months each. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	24.00 MO		0	0	307,483	0	307,483
USR AA Scraper, 2 yr.			0.00	0.00	37268.14	0.00	37268.14
2 scrapers for 12 months each. Based on a 2 yr lease purchase plan. Price quote from Western States Caterpillar.	24.00 MO		0	0	1,204,460	0	1,204,460
USR AA Compacter, 2 yr			0.00	0.00	17609.62	0.00	17609.62
1 compacter for 12 months. Based on a 2 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	284,561	0	284,561
05.06.01.02. EXPENSES							
05.06.01.03. OPERATIONS AND MAINTENANCE							
USR AC Backfill (loader w/ 3 trucks)			0.00	0.11	0.12	0.00	0.23
	173734 CY	JRCNTR5	657	25,015	28,046	0	53,061
USR AC Backfill (dozer), 1583 cy/hr			0.00	0.08	0.09	0.00	0.17
	695.00 CY	JRCNTR3	2	76	84	0	161
USR AC Backfill (dozer), 476 cy/hr			0.01	0.27	0.30	0.00	0.57
	3637.00 CY	JRCNTR3	35	1,328	1,469	0	2,797
USR AC Recontouring with Scraper, 180m			0.01	0.15	0.21	0.00	0.36
	25899 CY	JRCNTR1	137	5,247	7,471	0	12,718

05.06. RECLAMATION	QUANTY	UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Recontouring with Dozer, 105m				0.01	0.26	0.29	0.00	0.56
	10927	CY	JRCNTR2	102	3,891	4,305	0	8,196
USR AC Recontouring with Scraper,.150m				0.01	0.14	0.21	0.00	0.35
	26733	CY	JRCNTR1	135	5,190	7,390	0	12,580
05.06.02. REVEGETATION								
05.06.02.01. CAPITAL COSTS								
05.06.02.02. EXPENSES								
05.06.02.03. OPERATIONS AND MAINTENANCE								
05.06.03. DEMOBILIZATION								
05.06.03.01. CAPITAL COSTS								
05.06.03.02. EXPENSES								
05.06.03.03. OPERATIONS AND MAINTENANCE								
RECLAMATION				1,069	40,747	2,294,607	0	2,335,354
FY 2000				239,131	9,465,667	15,808,707	4,751,024	30,025,398

06.01. PRE-CONSTRUCTION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
06. FY 2001							
06.01. PRE-CONSTRUCTION							
06.01.01. PROCUREMENT							
06.01.01.01. CAPITAL COSTS							
06.01.01.02. EXPENSES							
06.01.01.03. OPERATIONS AND MAINTENANCE							
06.01.02. TRAINING							
06.01.02.01. CAPITAL COSTS							
USR CC 8 hr Rad Worker Trng Refresher			0.00	0.00	0.00	200.00	200.00
	218.00 EA		0	0	0	43,600	43,600
USR CC 8 hr Haz Wst Trng Refresher			0.00	0.00	0.00	130.00	130.00
	218.00 EA		0	0	0	28,340	28,340
06.01.02.02. EXPENSES							
06.01.02.03. OPERATIONS AND MAINTENANCE							
06.01.03. SITE PREPARATION							
06.01.03.01. CAPITAL COSTS							
06.01.03.02. EXPENSES							
06.01.03.03. OPERATIONS AND MAINTENANCE							
06.01.04. SITE MOBILIZATION							
06.01.04.01. CAPITAL COSTS							
06.01.04.02. EXPENSES							
06.01.04.03. OPERATIONS AND MAINTENANCE							
PRE-CONSTRUCTION			0	0	0	71,940	71,940

06.02. EXCAVATION/DEMOLITION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST

06.02. EXCAVATION/DEMOLITION
The following sites will be excavated during FY 01:
116-C-1, 116-B-15, *118-B-3, 120-B-1, 128-B-1, 128-B-2, *128-B-3, 600-33, 1607-B1, *118-B-1, *Effluent Pipelines.
* Indicates excavation will occur during more than one fiscal year.

06.02.01. EXCAVATION/DEMOLITION

06.02.01.01. CAPITAL COSTS

Item	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA 150,000 lb excavator (5 yr)			0.00	0.00	14214.87	0.00	14214.87
2 excavators for 10 months each. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	20.00 MO		0	0	382,839	0	382,839
USR AA 200,000 lb excavator (3 yr)			0.00	0.00	28828.00	0.00	28828.00
1 excavator for 12 months. Based on 3 yr lease purchase plan. Price quote from McDonald Industries Komatsu.	12.00 MO		0	0	465,843	0	465,843
USR AA 520 hp dozer			0.00	0.00	13326.49	0.00	13326.49
1 for excavation and 2 for stockpile management @ 10 mo each. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	30.00 MO		0	0	538,370	0	538,370
USR AA 375 hp front end loader			0.00	0.00	9783.78	0.00	9783.78
1 loader for 10 months. Based on a 5 yr lease purchase plan. Price quote from Western States Caterpillar.	10.00 MO		0	0	131,750	0	131,750
USR AA 150,000 lb excavator (4 yr)			0.00	0.00	17105.80	0.00	17105.80
4 excavators for 12 months each. Based on 4 yr lease purchase plan. Price quote from Western States Caterpillar.	48.00 MO		0	0	1,105,676	0	1,105,676
USR AA Crusting Agent			0.00	0.00	0.00	2.50	2.50
Based on quote from Soil Sement. Application done by water tanks and trucks.	6250.00 GAL		0	0	0	21,041	21,041

06.02. EXCAVATION/DEMOLITION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
06.02.01.02. EXPENSES							
06.02.01.03. OPERATIONS AND MAINTENANCE							
USR AC Medium sites with E1 crew			0.02	0.46	0.19	0.00	0.65
E1 crew consists of:	375431 CY	JEXC1	5,823	232,283	96,735	0	329,018
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator Production rate = 343 cy/hr							
USR AC Excavation of overburden & ramp			0.02	0.53	0.31	0.00	0.83
with E-2 crew.	27567 CY	JEXC2	495	19,524	11,421	0	30,945
E2 crew consists of: 2 Equipment operators 1 Laborer .5 Foremen 1 HPT - 1 Bulldozer 1 Front End Loader Production rate = 381 cy/hr							
USR AC Burial grounds with E3 crew			0.03	0.83	0.37	0.00	1.20
E3 crew consist of:	86949 CY	JEXC3	2,435	97,116	43,575	0	140,691
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 190 cy/hr							
USR AC E-1 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-1 crew will be down for 50 days * 8 hrs = 400 hrs.	400.00 HR	JEXSB1	1,400	55,847	0	0	55,847
USR AC E-3 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-3 crew will have 123 down days * 8 hrs per day = 984 hrs.	984.00 HR	JEXSB3	3,444	137,383	0	0	137,383
USR AC E-4 crew standby (weather delay)			3.50	103.68	0.00	0.00	103.68
It is estimated the E-4 crew will have 64 down days * 8 hrs per day = 512 hrs.	512.00 HR	JEXSB4	1,792	71,484	0	0	71,484

06.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Excavation with grapples E-3		0.02	0.55	0.25	0.00	0.80
E3 crew consists of:	6975.00 CY JEXC3	130	5,176	2,322	0	7,498
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 286 cy/hr						
USR AC Metals loading with E3 crew		0.03	0.92	0.41	0.00	1.34
E3 crew consists of:	37893 TON JEXC3	1,179	47,027	21,100	0	68,127
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 171 tons/hr						
USR AC Concrete loading with E-3 crew		0.02	0.55	0.25	0.00	0.80
E3 crew consists of:	478.00 CY JEXC3	9	355	159	0	514
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with grapples Production rate = 286 cy/hr						
USR AC Concrete Exc/Demo with E-4		0.14	4.15	3.74	0.00	7.89
E4 crew consists of:	478.00 CY JEXC4	67	2,669	2,408	0	5,077
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic Excavator with concrete processing equipment Production rate = 38 cy/hr						
USR AC Metals Exc/Demo with E-4		0.28	8.29	7.48	0.00	15.78
E4 crew consists of:	32908 TON JEXC4	9,214	367,561	331,542	0	699,103
1 Equipment operator 1 Laborer .5 Foreman 1 HPT						

06.02. EXCAVATION/DEMOLITION	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
1 Hydraulic exavator with concrete processing equipment						
Production rate = 19 ton/hr						
USR AC Exc/Demo with mobile shears, E-5		0.28	8.29	7.32	0.00	15.61
E5 crew consists of:	2207.00 TON JEXC5	618	24,651	21,756	0	46,407
1 Equipment operator 1 Laborer .5 Foreman 1 HPT 1 Hydraulic excavator with mobile shears						
Production rate = 19 tons/hr						
USR AC E-2 crew standby		4.50	131.83	0.00	0.00	131.83
It is extimated the E-2 crew will have 4 down days * 8 hrs per day = 32 hrs.	32.00 HR JEXSB2	144	5,681	0	0	5,681
USR AC E-5 crew standby		3.50	103.68	0.00	0.00	103.68
It is estimated the E-5 crew will have 2 down days * hrs per day = 16 hrs.	16.00 HR JEXSB5	56	2,234	0	0	2,234
USR AC Spoil pile dust suppression		0.00	0.00	17.35	0.00	17.35
Consists of 1-8,000 gallon water tank and sprinkler. Will need to be operated 250 days/yr, 8 hrs/shift * 2 shifts = 2000 hrs.	2000.00 HR JDST1	0	0	46,728	0	46,728
USR AC Excavation dust suppression		4.00	111.36	52.16	0.00	163.52
Consists of 1 water truck with driver for each active excavation. 2080 hrs/yr/shift * 2 shift for 1/2 yr = 2080 hrs.	2080.00 HR JDST3	8,320	311,915	146,110	0	458,025
USR AC Spoil Pile Management		1.00	28.62	48.32	0.00	76.94
Crew consists of 2 bulldozers with equipment operators. 2 crews/shift * 2080 hrs/yr * 2 shifts = 4160 hrs.	4160.00 HR JMSCL7	4,160	160,327	270,677	0	431,004
EXCAVATION/DEMOLITION		39,285	1,541,233	3,619,010	21,041	5,181,284

06.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
06.03. TRANSPORTATION							
06.03.01. RAIL							
06.03.01.01. CAPITAL COSTS							
USR AA Locomotives			0.00	0.00	16056.19	0.00	16056.19
2 locomotives for 10 months each. Based on a 5 yr lease purchase plan. Price quote from Morrison Knudsen Locomotives division for a refurbished locomotive.	20.00 MO		0	0	432,430	0	432,430
06.03.01.02. EXPENSES							
06.03.01.03. OPERATIONS AND MAINTENANCE							
USR OM Railroad track maintenance			0.00	0.00	0.00	20000.00	20000.00
Track maintenance will be provided as a service from WHC for $20,000 per mile.	19.00 MI		0	0	0	380,000	380,000
USR OM Locomotive operations			4.00	109.76	107.55	0.00	217.31
Crew consists of 3 locomotive operators and 1 broker. Locomotive needs to be operating every day of operations = 2080 hrs * 2 shifts = 4160 hrs.	4160.00 HR	JTRNS3	16,640	456,602	447,408	0	904,010
USR OM Rail Maintenance Facility M&O			0.00	0.00	960000.00	0.00	960000.00
Price based on direction from WHC.	1.00 YR		0	0	960,000	0	960,000
06.03.02. ROAD							
06.03.02.01. CAPITAL COSTS							
USR AA Trailers			0.00	0.00	995.89	0.00	995.89
20 trailers for 10 months each. Based on a 5 yr lease purchase plan. Price quote from Red River Trailers.	200.00 MO		0	0	268,216	0	268,216
USR AA Trucks			0.00	0.00	4102.72	0.00	4102.72
20 trucks for 10 months each. Based on a 5 yr lease purchase plan. Price quote from Kenworth.	200.00 MO		0	0	1,104,957	0	1,104,957

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

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06.03. TRANSPORTATION	QUANTY	UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA Roadbase Stockpile				0.00	0.00	0.00	12.50	12.50
Gravel losses due to regrading during the course of the year. Material prices based on $12.50/cy.	4318.00	CY		0	0	0	72,684	72,684

06.03.02.02. EXPENSES

06.03.02.03. OPERATIONS AND MAINTENANCE

It is estimated that the operators will be utilized 125 days 8 hrs per shift 2 shifts per day = 2000 hrs per truck * 20 trucks = 40000 hrs.

It is estimated that the trucks will be utilized 125 days 5.25 hrs per shift 2 shifts per day = 1312.5 hrs per truck * 20 trucks = 26250 hrs.

	QUANTY	UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR TR Truck operations				0.04	1.16	1.58	0.00	2.73
Truck crew consists of tractor trailer combination with driver. Production rate = 37.1 cy/hr	496922	CY	JTRNS1	20,359	935,505	1,275,217	0	2,210,722
USR AC Road crew operations				2.00	56.76	34.44	0.00	91.20
Crew consists of Motor grader and Water truck with operators. Operates 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00	HR	JMSCL12	8,320	317,965	192,923	0	510,888

06.03.03. CONTAINERS

06.03.03.01. CAPITAL COSTS

	QUANTY	UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA Container handlers				0.00	0.00	8698.79	0.00	8698.79
2 handlers for 10 months each. Based on a 5 yr lease purchase plan. Price quote from Washington Liftruck.	20.00	MO		0	0	234,278	0	234,278

06.03.03.02. EXPENSES

06.03.03.03. OPERATIONS AND MAINTENANCE

It is estimated 105 containers will be operating at any one time.

	QUANTY	UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Container Maintenance				0.00	0.00	378.00	0.00	378.00
Container used only during excavation hours = 200 days/yr. 5.25 hrs/shift * 2 shifts = 2100 hrs.	2100.00	HR	JTRNS4	0	0	1,068,943	0	1,068,943

06.03. TRANSPORTATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Container Transfer			2.00	56.42	28.99	0.00	85.41
Container loading occurs throughout the year = 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	2080.00 HR	JTRNS5	4,160	158,030	81,192	0	239,222
TRANSPORTATION			49,479	1,868,102	6,065,565	452,684	8,386,350
06.04. ANCILLARY							
06.04.01. EQUIPMENT DECON FACILITY							
06.04.01.01. CAPITAL COSTS							
06.04.01.02. EXPENSES							
06.04.01.03. OPERATIONS AND MAINTENANCE							
USR AC Equipment Decon Operations			1.00	25.38	0.00	0.00	25.38
Crew consists of 1 operator. Operations based on 2080 hrs/yr/shift * 2 shifts = 4160 hrs.	4160.00 HR	JMSCL11	4,160	142,177	0	0	142,177
USR OM Equipment Decon Maintenance			0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance and all utilities.	1440.00 SF		0	0	0	51,480	51,480
06.04.02. SURVEY STATION							
06.04.02.01. CAPITAL COSTS							
06.04.02.02. EXPENSES							
06.04.02.03. OPERATIONS AND MAINTENANCE It is estimated two stations will each be manned by 4 HPT's with equipment. The stations will be operated 250 days per year 8 hrs per shift = 2000 hrs per year per shift plus holidays = 2080 hrs. 2080 hrs/yr * 0.5 yrs * 2 crews/shift * 2 shifts = 4160 hrs.							
USR AC Survey station			4.00	144.48	0.00	0.00	144.48
	4160.00 HR	JFRSK1	16,640	809,365	0	0	809,365

06.04. ANCILLARY	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
06.04.03. OFFICE AREA						
06.04.03.01. CAPITAL COSTS						
06.04.03.02. EXPENSES						
USR AB Office Supplies and Equipment		0.00	0.00	0.00	25000.00	25000.00
Assume and annual cost of $25,000.	1.00 EA	0	0	0	33,665	33,665
06.04.03.03. OPERATIONS AND MAINTENANCE						
USR OM Waste Removal		0.00	0.00	0.07	0.00	0.07
13,261 gallons/day * 250 days/yr = 3,315,250. Provided as a service from WHC at a rate of $135/2000 gal = $0.0675/gal. For removal of liquid wastes from sanitary holding tanks.	3315250 GAL	0	0	232,068	0	232,068
USR OM Office Maintenance		0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr Includes facility maintenance, utilities, and janitorial. Based on 24'x48'= 1152 sf command control station, 28'x60'= 1680 sf lunchroom, and 42'x70'=2940 sf general support area. Total = 5772 sf. Provided as a service from WHC.	5772.00 SF	0	0	0	206,349	206,349
USR OM Change Trailer Maintenance		0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance, all utilities, and janitorial. Based on 14'x60' = 840 sf female trailer and a 28'x60' = 1680 sf male trailer. Total = 2520 sf.	2520.00 SF	0	0	0	90,090	90,090
USR OM Telephone		0.00	0.00	0.00	1247.40	1247.40
$103.95/line/mo * 12 mo = $1247.4/line/yr. Assume one line to both offices and one to the lunchroom. Total = 3 lines	3.00 EA	0	0	0	3,742	3,742

06.04. ANCILLARY	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
06.04.04. PERSONNEL DECON/CHANGE AREA							
06.04.04.01. CAPITAL COSTS							
06.04.04.02. EXPENSES							
06.04.04.03. OPERATIONS AND MAINTENANCE							
USR OM Maintenance			0.00	0.00	0.00	35.75	35.75
$35.75/sf/yr. Includes facility maintenance and all utilities. Based on 2-14'x56'= 1568 sf decontamination trailers.	1568.00 SF		0	0	0	56,056	56,056
06.04.05. RECEIVING AREA/WAREHOUSE							
06.04.05.01. CAPITAL COSTS							
06.04.05.02. EXPENSES							
06.04.05.03. OPERATIONS AND MAINTENANCE							
06.04.06. UTILITIES							
06.04.06.01. CAPITAL COSTS							
06.04.06.02. EXPENSES							
USR EP Potable Water Testing			0.00	0.00	0.00	2000.00	2000.00
Based on a quote from WHC as a service.	1.00 EA		0	0	0	2,000	2,000
06.04.06.03. OPERATIONS AND MAINTENANCE							
ANCILLARY			20,800	951,542	232,068	443,383	1,626,992
06.05. SUPPORT							
06.05.01. SUPPORT							
06.05.01.01. CAPITAL COSTS							
06.05.01.02. EXPENSES							
MIL AB Area Supervisors			0.00	0.00	0.00	5000.00	5000.00
5 area supervisor per shift. 4/shift * 12 mo * 2 shifts = 120 mo.	120.00 MON	N/A	0	0	0	807,969	807,969

06.05. SUPPORT	QUANTY UOM CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
MIL AB Clerks		0.00	0.00	0.00	1700.00	1700.00
1 clerk /shift * 2 shifts * 12 mo = 24 mo.	24.00 MO N/A	0	0	0	54,942	54,942
MIL AB Network Administrator		0.00	0.00	0.00	4200.00	4200.00
1 administrator/shift * 2 shifts * 12 mo = 24 mo.	24.00 MON N/A	0	0	0	135,739	135,739
MIL AB Project Engineer		0.00	0.00	0.00	4700.00	4700.00
5 engineers/shift * 2 shifts * 12 mo = 120 mo.	120.00 MON N/A	0	0	0	759,491	759,491
MIL AB Site Safety and QA		0.00	0.00	0.00	3800.00	3800.00
1 engineer/shift * 2 shift * 12 mo = 24 mo.	24.00 MON N/A	0	0	0	122,811	122,811
USR EP Medic support		4160.00	100000.00	0.00	0.00	100000.00
2 medics onsite @ $50,000/medic	2.00 YR	8,320	200,000	0	0	200,000
USR EP Laundry Service (yrs 2-5)		0.00	0.00	0.00	1350000.00	1350000.00
Based on 194 people changing 4 times a day for whites and 1 time a day for blues. Each change for whites weighs 3.02# and each change for blues 2#.	1.00 EA	0	0	0	1,350,000	1,350,000
USR EP Dosimetry		0.00	0.00	0.00	375.00	375.00
$200/yr for dosimetry and $175/yr for whole body count. Total = $375/yr. 218 people need dosimetry the second through the fifth year.	218.00 EA	0	0	0	81,750	81,750
USR EP Radio Maintenance		0.00	0.00	0.00	64.50	64.50
Assume 1 radio technician supporting the remediation charging out at $64.50/hr with 2080 hrs/yr.	2080.00 HR	0	0	0	134,160	134,160
USR EP Mask Service		0.00	0.00	0.00	240.48	240.48
$20.04/mo * 12 mo = $240.48/yr Assume the excavation crew will be in masks 25% of the time. Need 4 mask changes per day. 22 people @ 25% * 4/shift = 22 masks/shift * 2 shifts = 44.	44.00 EA	0	0	0	10,581	10,581
MIL AB General Superintendent (P.M.)		0.00	0.00	0.00	5300.00	5300.00
	12.00 MON N/A	0	0	0	85,645	85,645

06.05. SUPPORT	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR EP Garbage			0.00	0.00	0.00	10000.00	10000.00
Assume garbage collection will be $10,000 per year.	1.00 EA		0	0	0	10,000	10,000
USR EP Transport Vehicle Maintenance			0.00	0.00	0.00	2000.00	2000.00
Assume $2,000 per vehicle per year for maintenance at the 200 Area vehicle maintenance shop.	30.00 EA		0	0	0	60,000	60,000
USR EP Field Instrument Maintenance			0.00	0.00	0.00	64.50	64.50
Assume one technician supporting the project charging out @ $64.50/hr. Provided as a service by WHC. 2080 hrs.	2080.00 HR		0	0	0	134,160	134,160

06.05.01.03. OPERATIONS AND MAINTENANCE

It is estimated the excavation sites will need 2 sets of lights per excavation and on the average 3 sites will be operated at one time throughout the fiscal year = 6 sets of lights.

It is estimated the lights will be operated from 4 pm to 7 am 4 months of the year and 7 pm to 7 am 8 months per year.
15 hrs/day * 20.83 days/mo * 4 mo/yr = 1250 hrs/yr.
12 hrs/day * 20.83 days/mo * 8 mo/yr = 2000 hrs/yr.
Total = 3250 hrs/yr.
6 sets * 3250 hrs/yr = 19500 hrs.

	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Lighting with gen set			0.00	0.00	3.98	0.00	3.98
	19500 HR	JFLITE	0	0	104,511	0	104,511
USR AC Lid replacement/removal			1.00	27.30	7.83	0.00	35.13
Crew consists of 1 forklift with operator. Operations based on 2080 hrs/yr * 2 shifts for 1/2 yr = 2080 hrs.	2080.00 HR	JMSCL10	2,080	76,466	21,925	0	98,391
USR AC Classification operating crew			2.00	50.16	0.00	0.00	50.16
Crew consists of 2 operators. Operations based on 2080 hrs/yr/shift * 2 shifts for 1/2 yr = 2080 hrs.	2080.00 HR	JMSCL9	4,160	140,496	0	0	140,496
USR AC Offshift operations			8.00	230.97	89.81	0.00	320.78
Crew consists of : 1 HPT 1 Foreman Road crew 1 Grader with operator 1 Compactor with operator	2080.00 HR	JMSCL13	16,640	546,938	251,563	0	898,500

06.05. SUPPORT	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
1 Water truck with operator 1 Flatbed truck with driver Decon waste removal 1 Vacuum truck with operator Water refill 1 Water truck with operator Operations based on 2080 hrs/yr/shift * 1 shift = 2080 hrs.							
USR AC Miscellaneous Laborers			3.00	75.24	9.50	0.00	84.74
Crew consists of 3 laborers with pickups. Operation based on 2080 hrs/yr/shift	4160.00 HR	JMSCL8	12,480	421,488	53,192	0	474,681
USR OM Septic Service			0.00	0.00	0.00	14729.00	14729.00
Cost for supplying and servicing 17 porta-potties. Service provided by WHC.	1.00 YR		0	0	0	14,729	14,729
USR AC Sample Transport			1.00	24.99	3.18	0.00	28.17
Crew consists of one truck driver with pickup. Will pick up samples from the excavations and transport them to the lab for analysis. 2080 hrs/yr/shift * 2 shift/yr for 1/2 yr = 2080 hrs.	2080.00 HR	JMSCL6	2,080	69,996	8,910	0	78,906
SUPPORT			45,760	1,555,384	440,101	3,761,977	5,757,462
06.06. RECLAMATION							
06.06.01. RECONTOUR/BACKFILL							
06.06.01.01. CAPITAL COSTS							
USR AA Dozer, 4 yr.			0.00	0.00	16034.92	0.00	16034.92
1 dozer for 12 months. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	259,114	0	259,114
USR AA Loader, 4 yr.			0.00	0.00	11771.71	0.00	11771.71
1 loader for 12 months. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	190,224	0	190,224

06.06. RECLAMATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AA Compacter, 4 yr			0.00	0.00	9514.06	0.00	9514.06
2 compacters for 12 months. Based on a 4 yr lease purchase plan. Price quote from Western States Caterpillar.	24.00 MO		0	0	307,483	0	307,483
USR AA Scraper, 2 yr.			0.00	0.00	37268.14	0.00	37268.14
2 scrapers for 12 months each. Based on a 2 yr lease purchase plan. Price quote from Western States Caterpillar.	24.00 MO		0	0	1,204,460	0	1,204,460
USR AA Compacter, 2 yr			0.00	0.00	17609.62	0.00	17609.62
1 compacter for 12 months. Based on a 2 yr lease purchase plan. Price quote from Western States Caterpillar.	12.00 MO		0	0	284,561	0	284,561
06.06.01.02. EXPENSES							
06.06.01.03. OPERATIONS AND MAINTENANCE							
USR AC Backfill (loader w/ 3 trucks)			0.00	0.11	0.12	0.00	0.23
	872289 CY	JRCNTR5	3,301	125,596	140,815	0	266,411
USR AC Backfill (loader w/ 4 trucks)			0.00	0.12	0.14	0.00	0.27
	561063 CY	JRCNTR6	2,477	94,227	108,897	0	203,125
USR AC Backfill (loader w/ 5 trucks)			0.01	0.14	0.17	0.00	0.31
	1848.00 CY	JRCNTR7	9	355	419	0	774
USR AC Backfill (dozer), 476 cy/hr			0.01	0.27	0.30	0.00	0.57
	30805 CY	JRCNTR3	295	11,246	12,441	0	23,688
USR AC Backfill (dozer), 571 cy/hr			0.01	0.23	0.25	0.00	0.48
	64705 CY	JRCNTR3	517	19,692	21,785	0	41,477
USR AC Backfill (dozer), 1171 cy/hr			0.00	0.11	0.12	0.00	0.23
	2529.00 CY	JRCNTR3	10	375	415	0	790
USR AC Recontouring with Scraper, 210m			0.01	0.16	0.22	0.00	0.38
	45171 CY	JRCNTR1	250	9,567	13,623	0	23,190
USR AC Recontouring with Scraper, 135m			0.00	0.14	0.20	0.00	0.34
	45874 CY	JRCNTR1	223	8,550	12,175	0	20,724
USR AC Recontouring with Scraper, 285m			0.01	0.17	0.25	0.00	0.42
	648342 CY	JRCNTR1	3,942	151,046	215,080	0	366,126

06.06. RECLAMATION	QUANTY UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
USR AC Recontouring with Scraper, 120m			0.00	0.13	0.19	0.00	0.32
	8443.00 CY	JRCNTR1	39	1,513	2,155	0	3,668
USR AC Recontouring with Dozer, 45m			0.00	0.13	0.14	0.00	0.27
	1709.00 CY	JRCNTR2	8	298	330	0	628
USR AC Recontouring with Dozer, 22m			0.00	0.08	0.08	0.00	0.16
	18007 CY	JRCNTR2	48	1,846	2,042	0	3,888
USR AC Recontouring with Dozer, 60m			0.01	0.16	0.18	0.00	0.34
	562.00 CY	JRCNTR2	3	121	134	0	256
06.06.02. REVEGETATION							
06.06.02.01. CAPITAL COSTS							
USR CC Revegetation			0.00	0.00	0.00	258133.00	258133.00
Based on prices given by WHC. Provided as a service from WHC.	1.00 EA		0	0	0	258,133	258,133
06.06.02.02. EXPENSES							
06.06.02.03. OPERATIONS AND MAINTENANCE							
06.06.03. DEMOBILIZATION							
06.06.03.01. CAPITAL COSTS							
USR SS Structural Steel			7.11	207.16	50.70	1850.00	2107.85
Demobilization of structural steel for the Classification Structure. Work done by Stuctural Steel subcontractor.	3.60 TON	JMOBDMB4	26	1,215	297	10,848	12,360
USR SS Metal Joists/Trusses			6.67	187.61	36.20	700.00	923.81
Demobilization of Ceiling structure for the classification structure. Work done by a structural steel subcontractor.	8.60 TON	JMOBDMB5	57	2,628	507	9,806	12,941
USR SS Handrail			0.44	13.19	0.78	30.00	43.98
Demobilization of Handrail for classification structure. Work done by a structrural steel subcontractor.	128.00 LF	JMOBDMB7	57	2,751	163	6,255	9,169
M USR SS Metal Decking			0.01	0.24	0.01	0.00	0.25
Demobilization of Decking for Classification structure. Work	309.00 SF	JMOBDMB6	3	123	4	0	127

06.06. RECLAMATION	QUANTY	UOM	CREW ID	MANHRS	LABOR	EQUIPMNT	MATERIAL	TOTAL COST
done by a structural steel subcontractor.								
USR SS Structural Steel				7.11	207.16	50.70	1850.00	2107.85
Demobilization of the Equipment Decontamination facility. Work done by a structural steel subcontractor.	3.60	TON	JMOBDMB4	26	1,215	297	10,848	12,360
USR SS Metal Joists/Trusses				6.67	187.61	36.20	700.00	923.81
Demobilization for the equipment decontamination facility. Work done by a structural steel subcontractor.	8.60	TON	JMOBDMB5	57	2,628	507	9,806	12,941
USR AA Concrete loading with E-3 crew				0.02	0.55	0.25	0.00	0.80
Concrete pads for equipment decon station.	106.70	CY	JEXC3	2	79	36	0	115
USR AA Concrete Exc/Demo with E-4				0.14	4.15	3.74	0.00	7.89
Concrete pads for Equipment decon station	106.70	CY	JEXC4	15	596	537	0	1,133
USR AA Equipment Demobilization				1.00	28.14	0.00	592.04	620.18
Assume 1/2 the hours needed for mobilization.	1649.00	EA	JMOBDMB8	1,649	62,487	0	1,314,665	1,377,152
06.06.03.02. EXPENSES								
06.06.03.03. OPERATIONS AND MAINTENANCE								
RECLAMATION				13,014	498,155	2,778,501	1,620,361	4,897,017
FY 2001				168,338	6,414,415	13,135,244	6,371,385	25,921,045
100 B/C AREA REMEDIAL ACTIVITIES				1,023,473	39,992,593	73,425,988	31,170,054	144,588,635

Thu 25 Nov 1993 IT CORPORATION TIME 09:10:29
PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
100 B/C LSR BACKUP PAGE :
** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	JDST1	Spoil Pile Dust Suppression		PROD = 0.00%			CREW HOURS = 16000		
USR *	LSRWRTNK	E 8000 gal mobile water tank	5.00 HR	2.89			5.00	14.45	14.45
USR *	LSRWTRPMP	E Water pump for water tanks 33gp	5.00 HR	0.58			5.00	2.90	2.90
	TOTAL				0.00	0.00	10.00	17.35	17.35
	JDST3	Excavation Dust Suppression		PROD = 0.00%			CREW HOURS = 16640		
HAN *	D-TRKDVR5	L TRUCK DRIVER GROUP 5	4.00 HR	27.84	4.00	111.36			111.36
USR *	LSRWTRK	E WATER TRUCK 5,000 GAL	2.62 HR	19.33			2.62	50.64	50.64
USR *	LSRWTRPMP	E Water pump for water tanks 33gp	2.62 HR	0.58			2.62	1.52	1.52
	TOTAL				4.00	111.36	5.24	52.16	163.52
	JEXC1	Excavator w/ 6 cy bucket + laborer		PROD = 100%			CREW HOURS = 3094		
HAN *	D-EQPOP8	L POWER EQUIPMENT OPERATOR GRP 8	1.52 HR	29.69	1.52	45.13			45.13
HAN *	D-LABR1	L LABORERS GROUP 1	1.52 HR	25.08	1.52	38.12			38.12
HAN *	D-LABR1	F LABORERS GROUP 1	0.76 HR	25.58	0.76	19.44			19.44
USR	LSR150K	E HYD EXC, CWLR, 6 CY BKT, 150K 1	1.00 HR	65.63			1.00	65.63	65.63
HAN *	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.52 HR	36.12	1.52	54.90			54.90
	TOTAL				5.32	157.59	1.00	65.63	223.22
	JEXC2	Dozer/Loader with laborers		PROD = 100%			CREW HOURS = 3669		
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	3.04 HR	28.92	3.04	87.92			87.92
HAN *	D-LABR1	L LABORERS GROUP 1	1.52 HR	25.08	1.52	38.12			38.12
HAN *	D-LABR1	F LABORERS GROUP 1	0.76 HR	25.58	0.76	19.44			19.44
USR *	LSR375HP	E FE LOADER, 375 HP	1.00 HR	44.01			1.00	44.01	44.01
USR *	LSR700HP	E DOZER, 700 HP	1.00 HR	73.21			1.00	73.21	73.21
HAN *	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.52 HR	36.12	1.52	54.90			54.90
	TOTAL				6.84	200.38	2.00	117.22	317.60
	JEXC3	Excavator with grapple and laborers		PROD = 100%			CREW HOURS = 6371		
HAN *	D-EQPOP8	L POWER EQUIPMENT OPERATOR GRP 8	1.52 HR	29.69	1.52	45.13			45.13
HAN *	D-LABR1	L LABORERS GROUP 1	1.52 HR	25.08	1.52	38.12			38.12
HAN *	D-LABR1	F LABORERS GROUP 1	0.76 HR	25.58	0.76	19.44			19.44
USR *	LSR150K	E HYD EXC, CWLR, 6 CY BKT, 150K 1	1.00 HR	65.63			1.00	65.63	65.63
USR *	LSRGRPL	E 9 CY GRAPPLE, 4 TINES	1.00 HR	5.08			1.00	5.08	5.08
HAN	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.52 HR	36.12	1.52	54.90			54.90
	TOTAL				5.32	157.59	2.00	70.71	228.30
	JEXC4	Excavator with U P & laborers		PROD = 100%			CREW HOURS = 7623		
HAN *	D-EQPOP8	L POWER EQUIPMENT OPERATOR GRP 8	1.52 HR	29.69	1.52	45.13			45.13
HAN *	D-LABR1	L LABORERS GROUP 1	1.52 HR	25.08	1.52	38.12			38.12
HAN *	D-LABR1	F LABORERS GROUP 1	0.76 HR	25.58	0.76	19.44			19.44
USR	LSR150K	E HYD EXC, CWLR, 6 CY BKT, 150K 1	1.00 HR	65.63			1.00	65.63	65.63
HAN *	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.52 HR	36.12	1.52	54.90			54.90
USR	LSRUNVPSR	E UNIVERSAL PROCESSOR	1.00 HR	52.41			1.00	52.41	52.41
USR	LSRHAMMR	E Hydraulic Hammer	1.00 HR	24.11			1.00	24.11	24.11
	TOTAL				5.32	157.59	3.00	142.15	299.74

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
100 B/C LSR BACKUP PAGE 2
** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	JEXC5	Excavator with mobile shears		PROD = 100%			CREW HOURS =		339
HAN *	D-EQPOP8	L POWER EQUIPMENT OPERATOR GRP 8	1.52 HR	29.69	1.52	45.13			45.13
HAN *	D-LABR1	L LABORERS GROUP 1	1.52 HR	25.08	1.52	38.12			38.12
HAN *	D-LABR1	F LABORERS GROUP 1	0.76 HR	25.58	0.76	19.44			19.44
USR	LSR200K	E HYD EXC, CWLR, 200K lb	1.00 HR	95.52			1.00	95.52	95.52
USR	LSRMOBSHR	E MOBILE SHEARS FOR DEMOLITION	1.00 HR	31.97			1.00	31.97	31.97
HAN *	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.52 HR	36.12	1.52	54.90			54.90
USR	LSRDENS	E Material Densifier	1.00 HR	11.60			1.00	11.60	11.60
	TOTAL				5.32	157.59	3.00	139.09	296.68
	JEXSB1	E-1 Excavation Standby crew		PROD = 100%			CREW HOURS =		2248
HAN *	D-EQPOP8	L POWER EQUIPMENT OPERATOR GRP 8	1.00 HR	29.69	1.00	29.69			29.69
HAN *	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.00 HR	36.12	1.00	36.12			36.12
HAN *	D-LABR1	L LABORERS GROUP 1	1.00 HR	25.08	1.00	25.08			25.08
HAN *	D-LABR1	F LABORERS GROUP 1	0.50 HR	25.58	0.50	12.79			12.79
	TOTAL				3.50	103.68	0.00	0.00	103.68
	JEXSB2	E-2 Excavation Standby crew		PROD = 100%			CREW HOURS =		1967
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	2.00 HR	28.92	2.00	57.84			57.84
HAN *	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.00 HR	36.12	1.00	36.12			36.12
HAN *	D-LABR1	L LABORERS GROUP 1	1.00 HR	25.08	1.00	25.08			25.08
HAN *	D-LABR1	F LABORERS GROUP 1	0.50 HR	25.58	0.50	12.79			12.79
	TOTAL				4.50	131.83	0.00	0.00	131.83
	JEXSB3	E-3 Excavation Standby crew		PROD = 100%			CREW HOURS =		5780
HAN *	D-EQPOP8	L POWER EQUIPMENT OPERATOR GRP 8	1.00 HR	29.69	1.00	29.69			29.69
HAN *	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.00 HR	36.12	1.00	36.12			36.12
HAN *	D-LABR1	L LABORERS GROUP 1	1.00 HR	25.08	1.00	25.08			25.08
HAN *	D-LABR1	F LABORERS GROUP 1	0.50 HR	25.58	0.50	12.79			12.79
	TOTAL				3.50	103.68	0.00	0.00	103.68
	JEXSB4	E-4 Excavation Standby crew		PROD = 100%			CREW HOURS =		2929
HAN *	D-EQPOP8	L POWER EQUIPMENT OPERATOR GRP 8	1.00 HR	29.69	1.00	29.69			29.69
HAN *	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.00 HR	36.12	1.00	36.12			36.12
HAN *	D-LABR1	L LABORERS GROUP 1	1.00 HR	25.08	1.00	25.08			25.08
HAN	D-LABR1	F LABORERS GROUP 1	0.50 HR	25.58	0.50	12.79			12.79
	TOTAL				3.50	103.68	0.00	0.00	103.68
	JEXSB5	E-5 Excavation Standby crew		PROD = 100%			CREW HOURS =		336
HAN *	D-EQPOP8	L POWER EQUIPMENT OPERATOR GRP 8	1.00 HR	29.69	1.00	29.69			29.69
HAN *	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.00 HR	36.12	1.00	36.12			36.12
HAN *	D-LABR1	L LABORERS GROUP 1	1.00 HR	25.08	1.00	25.08			25.08
HAN	D-LABR1	F LABORERS GROUP 1	0.50 HR	25.58	0.50	12.79			12.79
	TOTAL				3.50	103.68	0.00	0.00	103.68

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
100 B/C LSR BACKUP PAGE 3
** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	JFLITE	Lights with generator set		PROD = 100%				CREW HOURS = 83175	
USR	LSRLITE	E LIGHT SET, 6KW W/ GEN, TRLR MTD	1.00 HR	3.98			1.00	3.98	3.98
	TOTAL				0.00	0.00	1.00	3.98	3.98
	JFRSK1	4 HPT's with geiger counters		PROD = 0.00%				CREW HOURS = 33600	
HAN	* D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	4.00 HR	36.12	4.00	144.48			144.48
	TOTAL				4.00	144.48	0.00	0.00	144.48
	JMOBDMB1	Concrete Formwork		PROD = 0.00%				CREW HOURS =	31
HAN	* D-CRPNTR3	L CRPNTRS-SAWFILER, STATIONARY PW	2.00 HR	29.20	2.00	58.40			58.40
HAN	* D-LABR2	L LABORERS GROUP 2	1.00 HR	25.38	1.00	25.38			25.38
USR	* D-CRPNTR3	F CRPNTRS-SAWFILER, STATIONARY PW	1.00 HR	29.70	1.00	29.70			29.70
MIL	* XMIXX010	E Misc. Power Tools	0.25 HR	5.85			0.25	1.46	1.46
MIL	* XMIXX020	E Small Tools	0.63 HR	1.39			0.63	0.88	0.88
	TOTAL				4.00	113.48	0.88	2.34	115.82
	JMOBDMB2	Concrete Reinforcing		PROD = 0.00%				CREW HOURS =	26
HAN	* D-IRNWKR	L IRONWORKERS	3.00 HR	31.20	3.00	93.60			93.60
USR	* D-IRNWKR	F IRONWORKERS	1.00 HR	31.70	1.00	31.70			31.70
MIL	* XMIXX020	E Small Tools	0.68 HR	1.39			0.68	0.95	0.95
	TOTAL				4.00	125.30	0.68	0.95	126.25
	JMOBDMB3	Concrete Placement		PROD = 0.00%				CREW HOURS =	13
HAN	* D-CMTMSN1	L CEMENT MASON - GROUP 1	1.00 HR	27.92	1.00	27.92			27.92
HAN	* D-LABR2	L LABORERS GROUP 2	4.00 HR	25.38	4.00	101.52			101.52
USR	* D-LABR2	F LABORERS GROUP 2	1.00 HR	25.88	1.00	25.88			25.88
MIL	* C65WC002	E CONC VIB.,HI-FREQ,INT,2-1/2"HD	2.00 HR	1.48			2.00	2.96	2.96
MIL	* G10HO004	E GEN SET, 5.5 KW, PORTABLE	1.00 HR	1.55			1.00	1.55	1.55
MIL	* XMIXX020	E Small Tools	0.68 HR	1.39			0.68	0.95	0.95
	TOTAL				6.00	155.32	3.68	5.46	160.78
	JMOBDMB4	Structural Steel		PROD = 0.00%				CREW HOURS =	10
HAN	* D-EQPOP8	L POWER EQUIPMENT OPERATOR GRP 8	1.00 HR	29.69	1.00	29.69			29.69
HAN	* D-IRNWKR	L IRONWORKERS	3.00 HR	31.20	3.00	93.60			93.60
USR	* D-IRNWKR	F IRONWORKERS	1.00 HR	31.70	1.00	31.70			31.70
USR	* D-IRNWKR	A IRONWORKERS	2.00 HR	24.96	2.00	49.92			49.92
MIL	* C80LI007	E CRANE,HYD,TRKMTD, 60T W/110'BOO	1.00 HR	54.45			1.00	54.45	54.45
MIL	* XMIXX020	E Small Tools	1.86 HR	1.39			1.86	2.59	2.59
HAN	D-EQPOP4	L POWER EQUIPMENT OPERATOR GRP 4	1.00 HR	28.14	1.00	28.14			28.14
	TOTAL				8.00	233.05	2.86	57.04	290.09

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
100 B/C LSR BACKUP PAGE 4
** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	JMOBDM85	Joist Installation				PROD = 0.00%			CREW HOURS =	17
HAN *	D-EQPOP1	L POWER EQUIPMENT OPERATOR GRP 1	2.00	HR	26.94	2.00	53.88			53.88
HAN *	D-EQPOP2	L POWER EQUIPMENT OPERATOR GRP 2	2.00	HR	27.30	2.00	54.60			54.60
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.00	HR	28.92	1.00	28.92			28.92
HAN *	D-IRNWKR	L IRONWORKERS	2.00	HR	31.20	2.00	62.40			62.40
USR *	D-IRNWKR	A IRONWORKERS	2.00	HR	24.96	2.00	49.92			49.92
USR *	D-IRNWKR	F IRONWORKERS	1.00	HR	31.70	1.00	31.70			31.70
MIL *	W35XX002	E WELDER, 200 AMP W/1 AXLE TRLR	2.00	HR	6.06			2.00	12.13	12.13
MIL *	XMIXX020	E Small Tools	2.87	HR	1.39			2.87	3.99	3.99
MIL *	C80GV004	E CRANE,HYD,TRK MTD, 35T W/80'BOO	1.00	HR	38.18			1.00	38.18	38.18
	TOTAL					10.00	281.42	5.87	54.30	335.72
	JMOBDM86	Metal Decking 1 1/2" Open 20 ga.				PROD = 0.00%			CREW HOURS =	1
HAN *	D-IRNWKR	A IRONWORKERS	3.00	HR	24.96	3.00	74.88			74.88
USR *	D-IRNWKR	F IRONWORKERS	1.00	HR	31.70	1.00	31.70			31.70
USR *	D-IRNWKR	L IRONWORKERS	5.00	HR	31.20	5.00	156.00			156.00
MIL *	W35XX002	E WELDER, 200 AMP W/1 AXLE TRLR	1.00	HR	6.06			1.00	6.06	6.06
MIL *	XMIXX020	E Small Tools	1.59	HR	1.39			1.59	2.21	2.21
	TOTAL					9.00	262.58	2.59	8.27	270.85
	JMOBDM87	Hand rail				PROD = 0.00%			CREW HOURS =	28
HAN *	D-IRNWKR	A IRONWORKERS	1.00	HR	24.96	1.00	24.96			24.96
USR *	D-IRNWKR	L IRONWORKERS	2.00	HR	31.20	2.00	62.40			62.40
USR *	D-IRNWKR	F IRONWORKERS	1.00	HR	31.70	1.00	31.70			31.70
MIL *	W35XX002	E WELDER, 200 AMP W/1 AXLE TRLR	1.00	HR	6.06			1.00	6.06	6.06
MIL *	XMIXX020	E Small Tools	0.72	HR	1.39			0.72	1.00	1.00
	TOTAL					4.00	119.06	1.72	7.07	126.13
	JMOBDM88	Mechanic for Equipment Mob				PROD = 0.00%			CREW HOURS =	6931
HAN *	D-EQPOP4	L POWER EQUIPMENT OPERATOR GRP 4	1.00	HR	28.14	1.00	28.14			28.14
	TOTAL					1.00	28.14	0.00	0.00	28.14
	JMSCL1	Fencing crew				PROD = 100%			CREW HOURS =	915
HAN *	D-LABR1	L LABORERS GROUP 1	2.00	HR	25.08	2.00	50.16			50.16
USR	D-LABR1	F LABORERS GROUP 1	1.00	HR	25.58	1.00	25.58			25.58
MIL *	T40XX012	E TRUCK OPT,FLATBED, 8' x 9.0'	1.00	HR	0.49			1.00	0.49	0.49
MIL *	T50GM012	E TRK, HWY, 2 AXLE, 24000 GVW, 4X	1.00	HR	11.99			1.00	11.99	11.99
MIL *	XMIXX020	E Small Tools	0.47	HR	1.39			0.47	0.65	0.65
	TOTAL					3.00	75.74	2.47	13.13	88.87
	JMSCL10	Lid placement/removal				PROD = 100%			CREW HOURS =	16640
USR *	LSRFRKLFT	E 10 ton forklift	0.66	HR	11.86			0.66	7.83	7.83
HAN *	D-EQPOP2	L POWER EQUIPMENT OPERATOR GRP 2	1.00	HR	27.30	1.00	27.30			27.30
	TOTAL					1.00	27.30	0.66	7.83	35.13

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
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** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	JMSCL11	Container decontamination			PROD = 100%			CREW HOURS = 18880	
HAN *	D-LABR2	L LABORERS GROUP 2	1.00 HR	25.38	1.00	25.38			25.38
	TOTAL				1.00	25.38	0.00	0.00	25.38
	JMSCL12	Road Crew (on shift)			PROD = 100%			CREW HOURS = 18720	
HAN *	D-TRKDVR5	L TRUCK DRIVER GROUP 5	1.00 HR	27.84	1.00	27.84			27.84
USR *	LSRGRDR	E 275 hp Motor Grader	0.66 HR	32.27			0.66	21.30	21.30
USR *	LSRWTRK	E WATER TRUCK 5,000 GAL	0.66 HR	19.33			0.66	12.76	12.76
USR *	LSRWTRPMP	E Water pump for water tanks 33gp	0.66 HR	0.58			0.66	0.38	0.38
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.00 HR	28.92	1.00	28.92			28.92
	TOTAL				2.00	56.76	1.98	34.44	91.20
	JMSCL13	Off shift Crews			PROD = 100%			CREW HOURS = 10400	
HAN *	D-EQPOP6	L POWER EQUIPMENT OPERATOR GRP 6	1.00 HR	28.62	1.00	28.62			28.62
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.00 HR	28.92	1.00	28.92			28.92
HAN *	D-TRKDVR2	L TRUCK DRIVER GROUP 2	1.00 HR	27.61	1.00	27.61			27.61
HAN *	D-TRKDVR5	L TRUCK DRIVER GROUP 5	3.00 HR	27.84	3.00	83.52			83.52
USR *	LSRFLTBED	E Flatbed pickup	0.66 HR	12.37			0.66	8.16	8.16
USR *	LSRRLLR	E 84" Vibratory roller	0.66 HR	20.77			0.66	13.71	13.71
USR *	LSRVACTRK	E Vacuum Truck	0.66 HR	26.94			0.66	17.78	17.78
USR *	LSRWTRK	E WATER TRUCK 5,000 GAL	1.31 HR	19.33			1.31	25.32	25.32
USR *	LSRWTRPMP	E Water pump for water tanks 33gp	1.31 HR	0.58			1.31	0.76	0.76
USR *	LSRGRDR	E 275 hp Motor Grader	0.66 HR	32.27			0.66	21.30	21.30
HAN *	D-HPT	L HAZARDOUS PROTECTION TECHNICIAN	1.00 HR	36.12	1.00	36.12			36.12
HAN	D-LABR3	F LABORERS GROUP 3	1.00 HR	26.18	1.00	26.18			26.18
MIL *	XMIXX020	E Small Tools	2.00 HR	1.39			2.00	2.78	2.78
	TOTAL				8.00	230.97	7.26	89.81	320.78
	JMSCL14	Cut and Fill, Dozer			PROD = 100%			CREW HOURS = 142	
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.83 HR	28.92	1.83	52.92			52.92
USR *	LSR700HP	E DOZER, 700 HP	1.00 HR	73.21			1.00	73.21	73.21
	TOTAL				1.83	52.92	1.00	73.21	126.13
	JMSCL2	Fencing gate crew			PROD = 100%			CREW HOURS = 93	
HAN *	D-EQPOP3	L POWER EQUIPMENT OPERATOR GRP 3	1.00 HR	27.96	1.00	27.96			27.96
HAN *	D-LABR1	L LABORERS GROUP 1	2.00 HR	25.08	2.00	50.16			50.16
MIL *	T40XX003	E HYDR CRANE FOR FLATBED, 8.0 TO	1.00 HR	11.92			1.00	11.92	11.92
MIL *	T40XX015	E TRUCK OPT,FLATBED, 8' x 14.0'	1.00 HR	0.60			1.00	0.60	0.60
MIL *	T50F0012	E TRK, HWY, 44,300 GVW, 3 AXLE	1.00 HR	29.28			1.00	29.28	29.28
USR *	D-LABR1	F LABORERS GROUP 1	1.00 HR	25.58	1.00	25.58			25.58
MIL *	XMIXX020	E Small Tools	0.47 HR	1.39			0.47	0.65	0.65
	TOTAL				4.00	103.70	3.47	42.45	146.15

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
100 B/C LSR BACKUP PAGE 6
** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	LABOR HOURS	LABOR COST	EQUIP HOURS	EQUIP COST	TOTAL COST
	JMSCL3	Clearing and Grubbing		PROD = 100%			CREW HOURS = 1380		
HAN *	D-EQPOP8	L POWER EQUIPMENT OPERATOR GRP 8	1.00 HR	29.69	1.00	29.69			29.69
HAN *	D-LABR1	L LABORERS GROUP 1	4.00 HR	25.08	4.00	100.32			100.32
USR *	D-LABR1	F LABORERS GROUP 1	1.00 HR	25.58	1.00	25.58			25.58
MIL *	820CI006	E CHIPPER, 16" CAPACITY, TRLR-MTD	1.00 HR	6.21			1.00	6.21	6.21
USR *	LSR375HP	E FE LOADER, 375 HP	1.00 HR	44.01			1.00	44.01	44.01
MIL *	XMIXX020	E Small Tools	0.74 HR	1.39			0.74	1.03	1.03
	TOTAL				6.00	155.59	2.74	51.25	206.84
	JMSCL4	Prepare and roll subbase		PROD = 100%			CREW HOURS = 2409		
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	2.00 HR	28.92	2.00	57.84			57.84
HAN *	D-LABR1	L LABORERS GROUP 1	2.00 HR	25.08	2.00	50.16			50.16
HAN *	D-TRKDVR5	L TRUCK DRIVER GROUP 5	1.00 HR	27.84	1.00	27.84			27.84
USR *	LSRRLLR	E 84" Vibratory roller	1.00 HR	20.77			1.00	20.77	20.77
USR *	LSRWTRK	E WATER TRUCK 5,000 GAL	1.00 HR	19.33			1.00	19.33	19.33
MIL *	XMIXX020	E Small Tools	2.00 HR	1.39			2.00	2.78	2.78
USR *	LSRGRDR	E 275 hp Motor Grader	1.00 HR	32.27			1.00	32.27	32.27
USR	D-EQPOP7	F POWER EQUIPMENT OPERATOR GRP 7	1.00 HR	29.42	1.00	29.42			29.42
	TOTAL				6.00	165.26	5.00	75.15	240.41
	JMSCL5	Grade and compact 12" agg base course		PROD = 100%			CREW HOURS = 1071		
HAN *	D-EQPOP6	L POWER EQUIPMENT OPERATOR GRP 6	2.00 HR	28.62	2.00	57.24			57.24
HAN *	D-LABR1	L LABORERS GROUP 1	3.00 HR	25.08	3.00	75.24			75.24
HAN *	D-TRKDVR3	L TRUCK DRIVER GROUP 3	2.00 HR	27.66	2.00	55.32			55.32
USR *	LSRGRDR	E 275 hp Motor Grader	1.00 HR	32.27			1.00	32.27	32.27
USR *	LSRRLLR	E 84" Vibratory roller	1.00 HR	20.77			1.00	20.77	20.77
USR *	LSRWTRK	E WATER TRUCK 5,000 GAL	1.00 HR	19.33			1.00	19.33	19.33
MIL *	R30IG008	E ROLLER,SM-DR,SELF,12T,3WHL,3"OV	1.00 HR	13.91			1.00	13.91	13.91
MIL *	T40XX012	E TRUCK OPT,FLATBED, 8' x 9.0'	1.00 HR	0.49			1.00	0.49	0.49
MIL *	T40XX018	E TRUCK OPT,FLATBED, 8' x 20.0'	1.00 HR	0.76			1.00	0.76	0.76
MIL *	T50GM008	E TRK,HWY,4X2 3500 PICKUP, 8600GV	1.00 HR	9.37			1.00	9.37	9.37
MIL *	T50GM012	E TRK, HWY, 2 AXLE, 24000 GVW, 4X	1.00 HR	11.99			1.00	11.99	11.99
MIL *	T50GM016	E TRK, HWY, 3 AXLE, 41000 GVW, 6X	1.00 HR	19.97			1.00	19.97	19.97
USR	D-EQPOP6	F POWER EQUIPMENT OPERATOR GRP 6	1.00 HR	29.12	1.00	29.12			29.12
MIL *	XMIXX020	E Small Tools	2.00 HR	1.39			2.00	2.78	2.78
	TOTAL				8.00	216.92	11.00	131.65	348.57
	JMSCL6	Sample transport crew		PROD = 100%			CREW HOURS = 16800		
USR *	LSRPKUP	E 1/2 ton pickup personnel trnspr	0.66 HR	4.82			0.66	3.18	3.18
HAN *	D-TRKDVR1	L TRUCK DRIVER GROUP 1	1.00 HR	24.99	1.00	24.99			24.99
	TOTAL				1.00	24.99	0.66	3.18	28.17
	JMSCL7	Storage pile maintenance crew		PROD = 100%			CREW HOURS = 33280		
HAN *	D-EQPOP6	L POWER EQUIPMENT OPERATOR GRP 6	1.00 HR	28.62	1.00	28.62			28.62
USR *	LSR700HP	E DOZER, 700 HP	0.66 HR	73.21			0.66	48.32	48.32
	TOTAL				1.00	28.62	0.66	48.32	76.94

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

100 B/C LSR BACKUP PAGE 7

** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	JMSCL8	Miscellaneous laborers (gophers)		PROD =	100%			CREW HOURS =	18720
HAN *	D-LABR1	L LABORERS GROUP 1	3.00 HR	25.08	3.00	75.24			75.24
USR *	LSRPKUP	E 1/2 ton pickup personnel trnspr	1.97 HR	4.82			1.97	9.50	9.50
	TOTAL				3.00	75.24	1.97	9.50	84.74
	JMSCL9	Waste Classification		PROD =	100%			CREW HOURS =	16800
HAN *	D-LABR1	L LABORERS GROUP 1	2.00 HR	25.08	2.00	50.16			50.16
	TOTAL				2.00	50.16	0.00	0.00	50.16
	JRCNTR1	Recontour Cut & Fill (Scraper)		PROD =	0.00%			CREW HOURS =	777
USR *	LSRSCRPR	E Scraper, Push Pull, 21 cy	2.00 HR	88.40			2.00	176.80	176.80
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	3.04 HR	28.92	3.04	87.92			87.92
HAN *	D-EQPOP4	L POWER EQUIPMENT OPERATOR GRP 4	1.52 HR	28.14	1.52	42.77			42.77
USR *	LSRCMPTR	E 315 hp Tamping foot Compactor	1.00 HR	50.22			1.00	50.22	50.22
HAN *	D-TRKDVR5	L TRUCK DRIVER GROUP 5	1.52 HR	27.84	1.52	42.32			42.32
USR *	LSRWTRK	E WATER TRUCK 5,000 GAL	1.00 HR	19.33			1.00	19.33	19.33
	TOTAL				6.08	173.01	4.00	246.35	419.36
	JRCNTR2	Recontour Cut & Fill (Dozer)		PROD =	0.00%			CREW HOURS =	35
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.52 HR	28.92	1.52	43.96			43.96
USR *	LSR700HP	E DOZER, 700 HP	1.00 HR	73.21			1.00	73.21	73.21
HAN *	D-EQPOP4	L POWER EQUIPMENT OPERATOR GRP 4	1.52 HR	28.14	1.52	42.77			42.77
USR	LSRCMPTR	E 315 hp Tamping foot Compactor	1.00 HR	50.22			1.00	50.22	50.22
HAN *	D-TRKDVR5	L TRUCK DRIVER GROUP 5	1.52 HR	27.84	1.52	42.32			42.32
USR	LSRWTRK	E WATER TRUCK 5,000 GAL	1.00 HR	19.33			1.00	19.33	19.33
	TOTAL				4.56	129.05	3.00	142.76	271.81
	JRCNTR3	Backfill (Dozer)		PROD =	0.00%			CREW HOURS =	268
USR *	LSR700HP	E DOZER, 700 HP	1.00 HR	73.21			1.00	73.21	73.21
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.52 HR	28.92	1.52	43.96			43.96
HAN *	D-TRKDVR5	L TRUCK DRIVER GROUP 5	1.52 HR	27.84	1.52	42.32			42.32
USR	LSRWTRK	E WATER TRUCK 5,000 GAL	1.00 HR	19.33			1.00	19.33	19.33
HAN *	D-EQPOP4	L POWER EQUIPMENT OPERATOR GRP 4	1.52 HR	28.14	1.52	42.77			42.77
USR	LSRCMPTR	E 315 hp Tamping foot Compactor	1.00 HR	50.22			1.00	50.22	50.22
	TOTAL				4.56	129.05	3.00	142.76	271.81
	JRCNTR5	Backfill (Loader w/ 3 Trucks)		PROD =	0.00%			CREW HOURS =	531
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.52 HR	28.92	1.52	43.96			43.96
HAN *	D-TRKDVR8	L TRUCK DRIVER GROUP 8 (3 ea)	4.56 HR	28.21	4.56	128.64			128.64
USR *	LSR375HP	E FE LOADER, 375 HP	1.00 HR	44.01			1.00	44.01	44.01
USR *	LSRTRCK	E Peterbilt 357	3.00 HR	39.13			3.00	117.39	117.39
USR *	LSRTRLR	E LSR trailer	3.00 HR	19.32			3.00	57.96	57.96
HAN *	D-TRKDVR5	L TRUCK DRIVER GROUP 5	1.52 HR	27.84	1.52	42.32			42.32
USR *	LSRWTRK	E WATER TRUCK 5,000 GAL	1.00 HR	19.33			1.00	19.33	19.33
HAN *	D-EQPOP4	L POWER EQUIPMENT OPERATOR GRP 4	1.52 HR	28.14	1.52	42.77			42.77
USR	LSRCMPTR	E 315 hp Tamping foot Compactor	1.00 HR	50.22			1.00	50.22	50.22
	TOTAL				9.12	257.69	9.00	288.91	546.60

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
100 B/C LSR BACKUP PAGE 8
** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	JRCNTR6	Backfill (Loader w/ 4 Trucks)			PROD = 0.00%		CREW HOURS =		233
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.52 HR	28.92	1.52	43.96			43.96
HAN *	D-TRKDVR8	L TRUCK DRIVER GROUP 8 (4 ea)	6.08 HR	28.21	6.08	171.52			171.52
USR *	LSR375HP	E FE LOADER, 375 HP	1.00 HR	44.01			1.00	44.01	44.01
USR *	LSRTRCK	E Peterbilt 357	4.00 HR	39.13			4.00	156.52	156.52
USR *	LSRTRLR	E LSR trailer	4.00 HR	19.32			4.00	77.28	77.28
HAN *	D-TRKDVR5	L TRUCK DRIVER GROUP 5	1.52 HR	27.84	1.52	42.32			42.32
USR *	LSRWTRK	E WATER TRUCK 5,000 GAL	1.00 HR	19.33			1.00	19.33	19.33
HAN *	D-EQPOP4	L POWER EQUIPMENT OPERATOR GRP 4	1.52 HR	28.14	1.52	42.77			42.77
USR	LSRCMPTR	E 315 hp Tamping foot Compactor	1.00 HR	50.22			1.00	50.22	50.22
	TOTAL				10.64	300.56	11.00	347.36	647.92
	JRCNTR7	Backfill (Loader w/ 5 Trucks)			PROD = 0.00%		CREW HOURS =		1
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.52 HR	28.92	1.52	43.96			43.96
HAN *	D-TRKDVR8	L TRUCK DRIVER GROUP 8 (5 ea)	7.60 HR	28.21	7.60	214.40			214.40
USR *	LSR375HP	E FE LOADER, 375 HP	1.00 HR	44.01			1.00	44.01	44.01
USR *	LSRTRCK	E Peterbilt 357	5.00 HR	39.13			5.00	195.65	195.65
USR *	LSRTRLR	E LSR trailer	5.00 HR	19.32			5.00	96.60	96.60
HAN *	D-TRKDVR5	L TRUCK DRIVER GROUP 5	1.52 HR	27.84	1.52	42.32			42.32
USR *	LSRWTRK	E WATER TRUCK 5,000 GAL	1.00 HR	19.33			1.00	19.33	19.33
HAN *	D-EQPOP4	L POWER EQUIPMENT OPERATOR GRP 4	1.52 HR	28.14	1.52	42.77			42.77
USR	LSRCMPTR	E 315 hp Tamping foot Compactor	1.00 HR	50.22			1.00	50.22	50.22
	TOTAL				12.16	343.44	13.00	405.81	749.25
	JSTL1	Railroad car assembly crew			PROD = 100%		CREW HOURS =		120
HAN *	D-LABR1	L LABORERS GROUP 1	1.00 HR	25.08	1.00	25.08			25.08
MIL *	C80LI001	E CRANE,HYD,TRKMTD, 14T W/80' 800	1.00 HR	39.35			1.00	39.35	39.35
HAN *	D-EQPOP6	L POWER EQUIPMENT OPERATOR GRP 6	1.00 HR	28.62	1.00	28.62			28.62
USR	D-LABR1	F LABORERS GROUP 1	1.00 HR	25.58	1.00	25.58			25.58
	TOTAL				3.00	79.28	1.00	39.35	118.63
	JSTL2	Railroad car welding crew			PROD = 100%		CREW HOURS =		271
MIL *	W35XX001	E WELDER, 250 AMP W/1 AXLE TRLR	1.00 HR	2.84			1.00	2.84	2.84
HAN *	D-EQPOP1	F POWER EQUIPMENT OPERATOR GRP 1	1.00 HR	27.44	1.00	27.44			27.44
	TOTAL				1.00	27.44	1.00	2.84	30.28
	JTRNS1	Truck driving crews			PROD = 0.00%		CREW HOURS =		97010
HAN *	D-TRKDVR8	L TRUCK DRIVER GROUP 8	1.52 HR	28.21	1.52	42.88			42.88
USR *	LSRTRCK	E Peterbilt 357	1.00 HR	39.13			1.00	39.13	39.13
USR *	LSRTRLR	E LSR trailer	1.00 HR	19.32			1.00	19.32	19.32
	TOTAL				1.52	42.88	2.00	58.45	101.33

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
100 B/C LSR BACKUP PAGE 3
** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO. UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	JTRNS2	Truck Operations standby			PROD = 100%		CREW HOURS = 3200		
HAN *	D-TRKDVR8	L TRUCK DRIVER GROUP 8	1.00 HR	28.21	1.00	28.21			28.21
	TOTAL				1.00	28.21	0.00	0.00	28.21
	JTRNS3	Locomotive operating crew			PROD = 100%		CREW HOURS = 18720		
HAN *	D-EQPOP3	L POWER EQUIPMENT OPERATOR GRP 3	2.00 HR	27.96	2.00	55.92			55.92
HAN *	D-EQPOP3	F POWER EQUIPMENT OPERATOR GRP 3	1.00 HR	28.46	1.00	28.46			28.46
USR	LSRLOCO	E LOCOMOTIVE	1.00 HR	81.15			1.00	81.15	81.15
HAN *	D-LABR2	L LABORERS GROUP 2	1.00 HR	25.38	1.00	25.38			25.38
USR	LSRFLTCR	E Flatcar (Railroad)	15.00 HR	1.76			15.00	26.40	26.40
	TOTAL				4.00	109.76	16.00	107.55	217.31
	JTRNS4	Container Upkeep			PROD = 0.00%		CREW HOURS = 9450		
USR	LSRCONT	E MULTIPLE USE CONTAINER	105.00 HR	3.60			105.00	378.00	378.00
	TOTAL				0.00	0.00	105.00	378.00	378.00
	JTRNS5	Container Loading			PROD = 0.00%		CREW HOURS = 16640		
HAN *	D-TRKDVR8	L TRUCK DRIVER GROUP 8	2.00 HR	28.21	2.00	56.42			56.42
USR *	LSRCHNLR	E Container Handler	0.66 HR	43.92			0.66	28.99	28.99
	TOTAL				2.00	56.42	0.66	28.99	85.41
	JULITY1	Excavation for pipes			PROD = 0.00%		CREW HOURS = 9		
HAN *	D-EQPOP2	L POWER EQUIPMENT OPERATOR GRP 2	1.00 HR	27.30	1.00	27.30			27.30
HAN *	D-LABR1	L LABORERS GROUP 1	0.25 HR	25.08	0.25	6.27			6.27
MIL *	T30VE003	E TRENCHER,CHAIN,6-18"X60" 8H&8LD	1.00 HR	12.21			1.00	12.21	12.21
	TOTAL				1.25	33.57	1.00	12.21	45.78
	JULITY11	7 Electricians w/ Aerial Platform			PROD = 0.00%		CREW HOURS = 134		
HAN *	D-ELECTR	L ELECTRICTIANS	3.00 HR	34.58	3.00	103.74			103.74
USR *	D-ELECTR	F ELECTRICTIANS	1.00 HR	35.08	1.00	35.08			35.08
USR *	D-ELECTR	A ELECTRICTIANS	3.00 HR	27.66	3.00	82.99			82.99
MIL *	P40RE001	E TRK,HWY,LINE TRK W/AERIAL PLATF	1.00 HR	30.00			1.00	30.00	30.00
MIL *	XMIXX020	E Small Tools	0.68 HR	1.39			0.68	0.95	0.95
	TOTAL				7.00	221.81	1.68	30.95	252.76
	JULITY12	3" CI Pipe Installation			PROD = 0.00%		CREW HOURS = 21		
HAN *	D-LABR2	L LABORERS GROUP 2	1.00 HR	25.38	1.00	25.38			25.38
HAN *	D-PLBRS	L PLUMBERS/STEAMFITTERS	1.00 HR	31.81	1.00	31.81			31.81
USR *	D-PLBRS	F PLUMBERS/STEAMFITTERS	0.50 HR	32.31	0.50	16.16			16.16
MIL *	XMIXX020	E Small Tools	0.67 HR	1.39			0.67	0.93	0.93
	TOTAL				2.50	73.35	0.67	0.93	74.28

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
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** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	JULITY13	1" PVC Pipe Installation			PROD =	0.00%			CREW HOURS =	12
HAN *	D-LABR2	L LABORERS GROUP 2	1.00	HR	25.38	1.00	25.38			25.38
HAN *	D-PLBRS	L PLUMBERS/STEAMFITTERS	1.00	HR	31.81	1.00	31.81			31.81
USR *	D-PLBRS	F PLUMBERS/STEAMFITTERS	0.17	HR	32.31	0.17	5.49			5.49
MIL *	XMIXX020	E Small Tools	1.00	HR	1.39			1.00	1.39	1.39
	TOTAL					2.17	62.68	1.00	1.39	64.07
	JULITY2	Laying Pipe (8" plastic)			PROD =	0.00%			CREW HOURS =	18
HAN *	D-LABR2	L LABORERS GROUP 2	3.00	HR	25.38	3.00	76.14			76.14
HAN *	D-PLBRS	L PLUMBERS/STEAMFITTERS	1.00	HR	31.81	1.00	31.81			31.81
HAN *	D-TRKDVR3	L TRUCK DRIVER GROUP 3	1.00	HR	27.66	1.00	27.66			27.66
MIL *	T40XX014	E TRUCK OPT,FLATBED, 8' x 12.0'	1.00	HR	0.56			1.00	0.56	0.56
MIL *	T50F0006	E TRK, HWY,F600,21,000 GVW, 2 AXL	1.00	HR	15.12			1.00	15.12	15.12
USR *	D-PLBRS	F PLUMBERS/STEAMFITTERS	0.50	HR	32.31	0.50	16.16			16.16
MIL *	XMIXX020	E Small Tools	1.00	HR	1.39			1.00	1.39	1.39
	TOTAL					5.50	151.77	3.00	17.07	168.83
	JULITY3	Installing Holding Tanks			PROD =	0.00%			CREW HOURS =	100
HAN *	D-EQPOP6	L POWER EQUIPMENT OPERATOR GRP 6	0.30	HR	28.62	0.30	8.59			8.59
HAN *	D-LABR1	L LABORERS GROUP 1	1.00	HR	25.08	1.00	25.08			25.08
HAN *	D-PLBRS	L PLUMBERS/STEAMFITTERS	1.00	HR	31.81	1.00	31.81			31.81
USR *	D-PLBRS	F PLUMBERS/STEAMFITTERS	1.00	HR	32.31	1.00	32.31			32.31
USR *	D-PLBRS	A PLUMBERS/STEAMFITTERS	1.00	HR	25.45	1.00	25.45			25.45
MIL *	C75GV001	E CRANE,HYD,SELF,ROUGH TER,4WD,18	0.30	HR	28.66			0.30	8.60	8.60
MIL *	XMIXX020	E Small Tools	1.32	HR	1.39			1.32	1.83	1.83
	TOTAL					4.30	123.23	1.62	10.43	133.67
	JULITY4	Sump for Sewer			PROD =	0.00%			CREW HOURS =	45
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.00	HR	28.92	1.00	28.92			28.92
HAN *	D-LABR1	L LABORERS GROUP 1	2.00	HR	25.08	2.00	50.16			50.16
USR *	D-LABR1	F LABORERS GROUP 1	0.25	HR	25.58	0.25	6.40			6.40
MIL *	L50CA001	E LD/BH,WH,1 CY FE BKT/24"BH DIP	1.00	HR	12.39			1.00	12.39	12.39
MIL *	XMIXX020	E Small Tools	0.13	HR	1.39			0.13	0.18	0.18
	TOTAL					3.25	85.47	1.13	12.57	98.04
	JULITY5	Laying Pipe (18" RCP)			PROD =	0.00%			CREW HOURS =	23
HAN *	D-EQPOP7	L POWER EQUIPMENT OPERATOR GRP 7	1.00	HR	28.92	1.00	28.92			28.92
HAN *	D-LABR2	L LABORERS GROUP 2	4.00	HR	25.38	4.00	101.52			101.52
USR *	D-LABR2	F LABORERS GROUP 2	1.00	HR	25.88	1.00	25.88			25.88
MIL *	L50CA001	E LD/BH,WH,1 CY FE BKT/24"BH DIP	1.00	HR	12.39			1.00	12.39	12.39
MIL *	XMIXX020	E Small Tools	0.48	HR	1.39			0.48	0.67	0.67
	TOTAL					6.00	156.32	1.48	13.05	169.37

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
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** CREW BACKUP **

SRC	ITEM ID	DESCRIPTION	NO.	UOM	RATE	**** LABOR **** HOURS	COST	**** EQUIP **** HOURS	COST	TOTAL COST
	JULITY6	Pump Installation				PROD = 0.00%			CREW HOURS =	40
HAN *	D-PLBRS	L PLUMBERS/STEAMFITTERS	1.00	HR	31.81	1.00	31.81			31.81
USR *	D-PLBRS	F PLUMBERS/STEAMFITTERS	0.50	HR	32.31	0.50	16.16			16.16
USR *	D-PLBRS	A PLUMBERS/STEAMFITTERS	1.00	HR	25.45	1.00	25.45			25.45
MIL *	XMIXX020	E Small Tools	0.72	HR	1.39			0.72	1.00	1.00
	TOTAL					2.50	73.41	0.72	1.00	74.41
	JULITY9	5 Electricians w/ Aerial Platform				PROD = 0.00%			CREW HOURS =	130
HAN *	D-ELECTR	L ELECTRICTIANS	2.00	HR	34.58	2.00	69.16			69.16
USR *	D-ELECTR	F ELECTRICTIANS	1.00	HR	35.08	1.00	35.08			35.08
USR *	D-ELECTR	A ELECTRICTIANS	2.00	HR	27.66	2.00	55.33			55.33
MIL *	P40RE001	E TRK,HWY,LINE TRK W/AERIAL PLATF	1.00	HR	30.00			1.00	30.00	30.00
MIL *	XMIXX020	E Small Tools	0.49	HR	1.39			0.49	0.68	0.68
	TOTAL					5.00	159.57	1.49	30.69	190.25

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

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** LABOR BACKUP **

SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
HAN	D-CMTMSN1	CEMENT MASON - GROUP 1	17.77	0.0%	0.0%	10.15	0.00	27.92	HR	11/10/93	0.00	13
HAN	D-CRPNTR3	CRPNTRS-SAWFILER, STATIONARY PWR	18.82	0.0%	0.0%	10.38	0.00	29.20	HR	11/10/93	0.00	94
HAN	D-ELECTR	ELECTRICTIANS	21.70	0.0%	0.0%	12.88	0.00	34.58	HR	11/10/93	0.00	1587
HAN	D-EQPOP1	POWER EQUIPMENT OPERATOR GRP 1	16.62	0.0%	0.0%	10.32	0.00	26.94	HR	11/10/93	0.00	305
HAN	D-EQPOP2	POWER EQUIPMENT OPERATOR GRP 2	16.92	0.0%	0.0%	10.38	0.00	27.30	HR	11/10/93	0.00	16683
HAN	D-EQPOP3	POWER EQUIPMENT OPERATOR GRP 3	17.47	0.0%	0.0%	10.49	0.00	27.96	HR	11/10/93	0.00	56253
HAN	D-EQPOP4	POWER EQUIPMENT OPERATOR GRP 4	17.62	0.0%	0.0%	10.52	0.00	28.14	HR	11/10/93	0.00	9747
HAN	D-EQPOP6	POWER EQUIPMENT OPERATOR GRP 6	18.02	0.0%	0.0%	10.60	0.00	28.62	HR	11/10/93	0.00	47042
HAN	D-EQPOP7	POWER EQUIPMENT OPERATOR GRP 7	18.27	0.0%	0.0%	10.65	0.00	28.92	HR	11/10/93	0.00	55768
HAN	D-EQPOP8	POWER EQUIPMENT OPERATOR GRP 8	18.92	0.0%	0.0%	10.77	0.00	29.69	HR	11/10/93	0.00	39173
HAN	D-HPT	HAZARDOUS PROTECTION TECHNICIAN	28.15	0.0%	0.0%	7.97	0.00	36.12	HR	10/12/93	0.00	190126
HAN	D-IRNWKR	IRONWORKERS	17.92	0.0%	0.0%	13.28	0.00	31.20	HR	11/10/93	0.00	371
HAN	D-LABR1	LABORERS GROUP 1	15.84	0.0%	0.0%	9.24	0.00	25.08	HR	11/10/93	0.00	176149
HAN	D-LABR2	LABORERS GROUP 2	16.09	0.0%	0.0%	9.29	0.00	25.38	HR	11/10/93	0.00	37898
HAN	D-LABR3	LABORERS GROUP 3	16.34	0.0%	0.0%	9.34	0.00	25.68	HR	11/10/93	0.00	10400
HAN	D-PLBRS	PLUMBERS/STEAMFITTERS	20.10	0.0%	0.0%	11.71	0.00	31.81	HR	11/10/93	0.00	471
HAN	D-TRKDVR1	TRUCK DRIVER GROUP 1	14.76	0.0%	0.0%	10.23	0.00	24.99	HR	11/10/93	0.00	16800
HAN	D-TRKDVR2	TRUCK DRIVER GROUP 2	16.95	0.0%	0.0%	10.66	0.00	27.61	HR	11/10/93	0.00	10400
HAN	D-TRKDVR3	TRUCK DRIVER GROUP 3	16.99	0.0%	0.0%	10.67	0.00	27.66	HR	11/10/93	0.00	2159
HAN	D-TRKDVR5	TRUCK DRIVER GROUP 5	17.14	0.0%	0.0%	10.70	0.00	27.84	HR	11/10/93	0.00	121694
HAN	D-TRKDVR8	TRUCK DRIVER GROUP 8	17.45	0.0%	0.0%	10.76	0.00	28.21	HR	11/10/93	0.00	187779

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

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PROJECT LSR2BC: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation

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** EQUIPMENT BACKUP **

SRC	EQUIP ID	DESCRIPTION	DEPR	CAPT	FUEL	FOG	EQ REP	TR WR	TR REP	TOTAL	UOM	** TOTAL ** HOURS
MIL	B20CI006	CHIPPER, 16" CAPACITY, TRLR-MTD	1.33	0.32	2.24	0.6	1.65	0.03		6.21	HR	1380
MIL	C65WC002	CONC VIB.,HI-FREQ,INT,2-1/2"HD	0.27	0.04	0.06	0.1	0.95			1.48	HR	27
MIL	C75GV001	CRANE,HYD,SELF,ROUGH TER,4WD,18T	9.20	3.48	3.62	1.0	9.89	1.20	0.18	28.66	HR	30
MIL	C80GV004	CRANE,HYD,TRK MTD, 35T W/80'BOOM	13.31	5.58	4.81	1.2	12.48	0.65	0.10	38.18	HR	17
MIL	C80LI001	CRANE,HYD,TRKMTD, 14T W/80' BOOM	14.04	5.21	5.90	2.1	11.28	0.69	0.10	39.35	HR	120
MIL	C80LI007	CRANE,HYD,TRKMTD, 60T W/110'BOOM	18.76	7.89	7.08	1.8	17.59	1.12	0.17	54.45	HR	10
MIL	G10HO004	GEN SET, 5.5 KW, PORTABLE	0.22	0.05	0.90	0.2	0.17			1.55	HR	13
MIL	L50CA001	LD/BH,WH,1 CY FE BKT/24"BH DIP	3.72	1.26	1.83	0.5	4.39	0.53	0.08	12.39	HR	68
USR	LSR150K	HYD EXC, CWLR, 6 CY BKT, 150K lb			15.59	6.3	43.70			65.63	HR	17088
USR	LSR200K	HYD EXC, CWLR, 200K lb			21.94	9.7	63.84			95.52	HR	339
USR	LSR375HP	FE LOADER, 375 HP			11.11	4.0	17.20		11.66	44.01	HR	5815
USR	LSR700HP	DOZER, 520 HP			16.74	6.0	50.47			73.21	HR	26080
USR	LSRCHNLR	Container Handler			11.46	2.7	27.06	2.32	0.34	43.92	HR	10982
USR	LSRCMPTR	315 hp Tamping foot Compactor			12.28	3.2	34.69			50.22	HR	1846
USR	LSRCONT	MULTIPLE USE CONTAINER				0.2	3.33			3.60	HR	992250
USR	LSRDENS	Material Densifier				1.4	10.20			11.60	HR	339
USR	LSRFLTBED	Flatbed pickup			7.20	2.1	2.42	0.51	0.08	12.37	HR	6864
USR	LSRFLTCR	Flatcar (Railroad)				0.0	1.69			1.76	HR	280800
USR	LSRFRKLFT	10 ton forklift			3.69	0.8	6.60	0.59	0.09	11.86	HR	10982
USR	LSRGRDR	275 hp Motor Grader			7.44	2.5	19.67	2.29	0.34	32.27	HR	22699
USR	LSRGRPL	9 CY GRAPPLE, 4 TINES				0.7	4.38			5.08	HR	6371
USR	LSRHAMMR	Hydraulic Hammer				3.5	20.61			24.11	HR	7623
USR	LSRLITE	LIGHT SET, 6KW W/ GEN, TRLR MTD			0.58	0.1	3.17	0.08	0.01	3.98	HR	83175
USR	LSRLOCO	LOCOMOTIVE			35.97		45.18			81.15	HR	18720
USR	LSRMOBSHR	MOBILE SHEARS FOR DEMOLITION				3.6	28.37			31.97	HR	339
USR	LSRPKUP	1/2 ton pickup personnel trnsprt			2.67	0.7	1.20	0.17	0.03	4.82	HR	47966
USR	LSRRLLR	84" Vibratory roller			6.36	2.0	11.68	0.61	0.09	20.77	HR	10344
USR	LSRSCRPR	Scraper, Push Pull, 21 cy			20.09	5.2	43.94	16.65	2.50	88.40	HR	1555
USR	LSRTRCK	Peterbilt 357			7.01	1.6	27.12		3.34	39.13	HR	39539
USR	LSRTRLR	LSR trailer				0.7	11.94	5.76	0.84	19.32	HR	99539
USR	LSRUNVPSR	UNIVERSAL PROCESSOR				5.6	46.81			52.41	HR	7623
USR	LSRVACTRK	Vacuum Truck			9.89	2.7	14.28			26.94	HR	6864
USR	LSRWRTNK	8000 gal mobile water tank			0.65	0.1	1.82	0.22	0.03	2.89	HR	80000
USR	LSRWTRK	WATER TRUCK 5,000 GAL			5.17	1.6	10.21	2.00	0.30	19.33	HR	74902
USR	LSRWTRPMP	Water pump for water tanks 33gpm			0.34	0.1	0.13			0.58	HR	149576
MIL	P40RE001	TRK,HWY,LINE TRK W/AERIAL PLATFM	6.46	1.60	10.47	3.8	7.42	0.18	0.03	30.00	HR	264
MIL	R30IG008	ROLLER,SM-DR,SELF,12T,3WHL,3"OVL	4.71	1.37	2.24	0.5	5.04			13.91	HR	1071
MIL	T30VE003	TRENCHER,CHAIN,6-18"X60" BH&BLD	4.01	0.99	1.59	0.4	4.93	0.21	0.03	12.21	HR	9
MIL	T40XX003	HYDR CRANE FOR FLATBED, 8.0 TON	4.98	1.20		0.2	5.49			11.92	HR	93
MIL	T40XX012	TRUCK OPT,FLATBED, 8' x 9.0'	0.24	0.06			0.20			0.49	HR	1985
MIL	T40XX014	TRUCK OPT,FLATBED, 8' x 12.0'	0.27	0.06			0.22			0.56	HR	18
MIL	T40XX015	TRUCK OPT,FLATBED, 8' x 14.0'	0.29	0.07			0.24			0.60	HR	93
MIL	T40XX018	TRUCK OPT,FLATBED, 8' x 20.0'	0.37	0.09			0.30			0.76	HR	1071
MIL	T50F0006	TRK, HWY,F600,21,000 GVW, 2 AXLE	2.32	0.65	7.20	2.1	2.20	0.51	0.08	15.12	HR	18
MIL	T50F0012	TRK, HWY, 44,300 GVW, 3 AXLE	4.81	1.22	13.51	4.3	4.23	1.03	0.15	29.28	HR	93
MIL	T50GM008	TRK,HWY,4X2 3500 PICKUP, 8600GVW	1.33	0.33	4.78	1.3	1.35	0.21	0.03	9.37	HR	1071
MIL	T50GM012	TRK, HWY, 2 AXLE, 24000 GVW, 4X2	2.62	0.73	4.42	1.1	2.48	0.51	0.08	11.99	HR	1985
MIL	T50GM016	TRK, HWY, 3 AXLE, 41000 GVW, 6X4	4.17	1.08	7.46	2.0	3.69	1.29	0.19	19.97	HR	1071
MIL	W35XX001	WELDER, 250 AMP W/1 AXLE TRLR	0.62	0.19	1.00	0.2	0.75	0.03		2.84	HR	271
MIL	W35XX002	WELDER, 200 AMP W/1 AXLE TRLR	0.45	0.14	3.95	0.9	0.54	0.03		6.06	HR	63
MIL	XMIXX010	Misc. Power Tools	1.95	0.70	0.55	0.2	2.41			5.85	HR	8

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A

Thu 25 Nov 1993 IT CORPORATION TIME 09:10:29
PROJECT LSR28C: 100 B/C AREA REMEDIAL ACTIVITIES - 100 B/C Large Scale Remediation
100 B/C LSR BACKUP PAGE 14
** EQUIPMENT BACKUP **

SRC	EQUIP ID	DESCRIPTION	DEPR	CAPT	FUEL	FOG	EQ REP	TR WR	TR REP	TOTAL	UOM	** TOTAL ** HOURS
MIL	XMIXX020	Small Tools	0.46	0.17	0.13	0.0	0.57			1.39	HR	29767

LABOR ID: NAT92A EQUIP ID: NAT92A Currency in DOLLARS CREW ID: NAT92A UPB ID: NAT92A